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RUNNING WITH SCISSORS

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Divide, Switch, Blend. Exploring two hats for industry entrepreneurship and academic practice-based textile design research

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Abstract: This paper explores different approaches taken when 'wearing two hats'; that of academic researcher and the industry entrepreneur. It considers the barriers and opportunities in combining these two roles in order to acquire new knowledge. To understand how future researchers could best do this and why this might be desirable, the paper presents Author1's insights from field research experience; wearing both hats within a textile industry context. A literature review, reflective practice and an annotated portfolio method enabled the authors to identify three approaches – *Divide, Switch* and *Blend.* These form a model for researching with any two hats on: *Divide* entails wearing both hats separately on different occasions; *Switch* is wearing both hats but interchanging between the two on a single occasion; *Blend* is wearing both hats simultaneously. The authors conclude that fluidity between approaches and an understanding of the dominant hat is vital.

Keywords: Academic Research, Entrepreneurship, Dual Roles, Textile Design, Two Hats

To Be or Not to Be. The Servitization Dilemma and the Role of Design

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Abstract: This article seeks to answer the question of how value proposition is created using a human-centred approach in the context of deservitization, in general, and service dilution, in particular. The article aims to describe the journey of a company which undertook service dilution and used human-centred design to create a new product-oriented value proposition. The study adopted a research through design approach in conjunction with a single case study of an engineering and manufacturing services provider that recently initiated a service dilution process. Within the framework of university-business collaboration, a design project was developed. The main insights of the study pertain to the role of human-centred design as a way of learning and surpassing the pure exploitation of existing capabilities during the service dilution process. Learning by design is also seen as a potential alternative learning process that fuels exploration during the service dilution process.

Keywords: business model innovation, value proposition, deservitization, learning, human-centred design

Designers Designing Businesses.
Understanding how designers create enterprises

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Abstract: This paper is based on a practice-based research project which investigates the roles that designers play when designing businesses, highlighting their strengths and weaknesses. During this project, the first author designed a business concept for a client. The research methods presented in this paper were used to both carry out the business design project and to answer the research questions. Research questions were answered by integrating findings from literature review, eight interviews with designer-entrepreneurs and business designers based in Barcelona, Madrid, Naples and Berlin and observations of fifteen enterprises in Helsinki, Barcelona, Paris, Naples and Milan. The study provides evidence that designers have a distinctive way to create and conduct businesses, combining methods and approaches typical of their profession and following a process similar to the one employed in business design firms and proposed by business design scholars.

Keywords: business design, strategic design, design and entrepreneurship.

Systemic Incubator for Local Eco-Entrepreneurship to favour a Sustainable Local Development. Guidelines Definition

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Abstract: Systemic Design (SD) has demonstrated over the years the ability to create eco-opportunities for innovation in the manufacturing sector. Despite SD projects high value, the implementation of these complex projects is difficult, although this can boost local economies preventing waste creation to reach a sustainable local development. This research investigates the relationship between design, entrepreneurship and environmental sustainability, questioning how best support emerging businesses created by SD, and reflecting on the incubation services that are needed to develop eco-opportunities. To sustain this thesis is analysed a project for the textile industry developed by master students in SD under the framework of RETRACE European project for Piedmont Region (Italy), the area on which the SD research group is reflecting with policymakers. The result is the definition of guidelines to ease SD projects implementation and design a new Systemic Incubator for local eco-entrepreneurship, highlighting the strategic role of systemic design.

Keywords: systemic design, eco-entrepreneurship, local economic development, zero waste, business incubator, textile, Piedmont Region.

Design-Led Innovation Strategies of Family Entrepreneurs. Case-based Evidence from an Emerging Market

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Abstract: This paper reveals insights from an ongoing PhD study engaging with the innovation management of family owned furniture manufacturers in Turkey. The initial findings presented in this paper relate to the strategies applied in the innovation process of the first case study undertaken within the ongoing PhD. The aim of the study is to seek the entrepreneurial opportunities and challenges when achieving Design-Led Innovation (DLI) in an emerging market. The data are hoped to provide a better understanding of the factors affecting a family business to gain competitive advantage in the market through innovation. The main insight presented in this paper is that family entrepreneurs have unique decision-making processes and strategies during phases of innovation. The other key initial insight found through thematic analysis of in-depth qualitative interviews include key concepts such as vision for design awareness, strengthening existing know-how, customer-oriented strategy, and investment in knowledge.

Keywords: Family Business, Design-Led Innovation, Innovation Management, Emerging Markets

Design Thinking Driven Interdisciplinary Entrepreneurship. A Case Study of College Students Business Plan Competition

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Abstract: Based on the experience in interdisciplinary entrepreneurship and interdisciplinary talent cultivation, we aim to explore the atmosphere creation throughout creativity, innovation, and entrepreneurship, as well as the clues of talent cultivation. The study was implemented under the background of new industrial and social demands and with a college student competition as an example. Totally 92 groups joined the college student entrepreneurship competition. Firstly, the interdisciplinary groups involving students majoring in design (Team A) outperformed other groups. Secondly, Team A acquired a higher ratio of investment than other teams. Thirdly, design thinking analysis showed three indices (Innovation approach, Test, Experimentation) were less understood by non-design students and thus should be more treasured during design education. Moreover, an open innovation platform was offered to facilitate multidisciplinary group cooperation and make active attempts to dock social demands and resources. This platform will be of reference for the cultivation of innovative talents.

Keywords: Design thinking, Interdisciplinary, Human-centered design, College student entrepreneurship

How can Design Thinking promote entrepreneurship in young people?

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Abstract: Design Thinking has the potential to promote entrepreneurial competencies in European schools. This paper presents an Educational Programme based on Design Thinking and its empirical application in the curricula in four European countries. Targeting 10-15 year old students, the programme demonstrates an impact on entrepreneurial attitudes. Over 300 participants in Cyprus, Denmark, France and Spain responded positively to the initiative and reported a better understanding of entrepreneurship. Qualitative and quantitative results also showed that Design Thinking based strategies are effective to foster entrepreneurial skills such as creativity, problem solving and self-confidence. Interestingly however, experimentation results reported a negative impact on collaboration related skills.

Keywords: Design Thinking, Entrepreneurship, Problem Solving, Education

Designing Craft Opportunity. An Entrepreneurial Approach To Creating The Craft Scotland Summer Show

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Abstract: Building appropriate support and opportunity in the creative industries can be a challenging task. Understanding that the shifting contexts of the creative industries, specifically the craft sector, make the development of a programme of support difficult for national organisations, this paper suggests that the application of entrepreneurial design is a theory well suited to the task. Drawing on six years of iteration of an annual commercial craft exhibition, the paper presents an early case study that aligns development of the Craft Scotland Summer Show with models of entrepreneurial design, highlighting the processes that are shared, and the areas that may potentially be improved. Doing so begins to lay the foundation for greater analysis and evaluation of the interaction between an organisation and the community it serves, with an eventual goal of understanding how this relationship impacts upon the Scottish makers.

Keywords: craft, creative industries, design, entrepreneurship

The Contribution of Design and Prototyping to Enhancing Organisational Growth, Management and Entrepreneurship

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Abstract: Prototyping is a creative activity which usually results in a new product or process. In addition however, when engaged in by teams or groups, it encourages positive interpersonal relationships and strong team coherence. This paper is concerned with this latter activity and is referred to as "prototype as experience" or "experiencing the artefact". The paper briefly reviews Schrages use of the expressions, "prototypes as hypothesis, marketplace and playground" and elaborates on his notion of "charismodel" as an ideal state in the prototyping process. It also comments on the role of convergence in establishing "unity with diversity" in the team. The paper brings all of this together by expressing the prototyping activity in the form of an "S" curve and relating this to other "S" curves found in organisational dynamics. It concludes with some suggestions of our future intentions to test, by experiment, some of the ideas and speculations in this paper.

Keywords: Design, Prototyping, Growth, "S" Curves, Living Systems.

The Beauty of Design Thinking – Is there a Small Beast in the Box

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Abstract: Previous research remains silent on the cognitive constrains for design thinking in SMEs making a living from customers on B2B markets. Through a cognitive lens, the article explores constrains for design thinking among SME top managers found in traditional trades as iron and metal workshops, plastic industry, machine makers, machine tool makers, and building and construction industry. These managers' cognition is shaped in conjunction with the organizational and inter-organizational spaces of the SMEs. Five SME cases are explored from applying inductive and qualitative research techniques. The article points at five themes reflecting significant cognitive barriers for design thinking in SMEs. Overall, it is concluded that design thinking face barriers in SMEs, since managers have difficulties perceiving with fresh eyes the structures and dominant logics that determine them.

Keywords: SMEs, B2B markets, design thinking, cognitive barriers, opportunity creation

Implementing design thinking as didactic method in entrepreneurship education. The importance of through

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Abstract: Entrepreneurship has traditionally been taught *about* entrepreneurship. However, teaching entrepreneurship requires practice and learning by doing. Entrepreneurship education requires education *through* entrepreneurship where the students feel the real life of being an entrepreneur. The process of Design Thinking offers a method for teaching *through* entrepreneurship. This paper studies the didactic experiences from a course at Örebro University School of Business where entrepreneurship was taught using Design Thinking as a method, enabling the *through* dimension. Results from a survey show that Design thinking as a method benefits entrepreneurship education. Some of the key elements contributing to the understanding of entrepreneurship and the iterative approach was a study visit and interaction with stakeholders, a target group of elderly people.

Keywords: Design Thinking, Entrepreneurship education, Business school, Course development, Teaching model

A Darker Side of Creative Entrepreneurship

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Abstract: This article aims to contrast positive interpretations of enterprise in creative work, which are characterised by freedom, autonomy and choice with less optimistic accounts of the nature of enterprise in the creative industries. By examining extant literature, it illustrates the entrepreneurial responses of designers to instable and dynamic market conditions. It charts how designers adapt to market forces by reconciling creative and commercial pressures, enhancing their labour mobility and commercialising their own labour potential. This article argues that designer's normative feelings about their work enable them to reconcile the challenging aspects of their work.

Keywords: Design, Creative Industries, Enterprise, Entrepreneurialism, Designers.

Realising the value of open innovation in policy making. Equipping entrepreneurs for valuation work

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Abstract: Open innovation succeeds when it forms productive collaborations that cross organisational, disciplinary and practice boundaries. Success can, however, be hidden from stakeholders if the means to articulate value in novel, entrepreneurial open innovation work do not exist. We present collaborative design research tackling this challenge with the Cabinet Office Open Innovation Team (OIT) within UK Government. Drawing on the findings of an ethnographic study we show how 'open innovation' and 'entrepreneurial' theories were used in practice to characterise the need for valuing the OIT's work. Using participatory design and co-design theory and methods we describe a multi-disciplinary intervention with the OIT, equipping them to collectively visualise their practice and to co-design new tools to support new and evolving valuation activities. We offer insights for collaborative design in open innovation settings and discuss the potential for co-designed tools to enable valuation in entrepreneurial practice.

Keywords: Open innovation, Entrepreneurship, Valuation, Co-design, Tools

Entrepreneurship and Innovation Design in Education. An educational experience to train the new entrepreneurial designers.

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Abstract: We live in a context where the demand for satisfying emerging and segmented needs or complex and challenging problems with new and better services is emerging in any sector of human activity. The foremost paradigm able to properly answer to these challenges seems to be the innovation field through one of his main leading actors: the entrepreneur. This actor is promoting new ways to conceive the innovative project, its needs, its process and approaches to better fit what the context requires and provide. In that lies the need to get closer and transmit the entrepreneurial and innovation methodology and vision into the design fields with educational programs able to empower new generation designer alike to become an active participant of the social transformation by conceiving, design and distribute impactful entrepreneurial design projects. This contribution will focus on why and how to set an educational experience to train the new entrepreneurial designers.

Keywords: Entrepreneurship Design, Innovation Design, Education.

Design as a Catalyst for Innovation in Irish Industry. Evolution of the Irish Innovation Voucher Initiative within Design+ Technology Gateway

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Abstract: Innovation has been identified as a key driver for rebuilding the Irish economy. Design has been recognised as a strategic tool in delivering innovation. The difficulty is in understanding how designers utilise this methodology in a business context. The research question is; how do the applied design research experts transfer knowledge to industry. The methodological approach has been a single case, case study of an Industry Gateway within an Institute of Technology, utilising Innovation Vouchers as the unit of analysis. The findings have highlighted that it is the combination of; time spent, environment and tacit knowledge of designers that enables the process. The Innovation Voucher initiative is identified as an opportunity to introduce Irish Industry to innovation and the human resource behind the value of design. This may now be of benefit to other innovation accelerator initiatives in communicating how design can be utilised as a catalyst for innovation.

Keywords: Design, Ireland, Institute, Industry, Innovation

Design within Social Entrepreneurship. A Framework to reveal the use of Design in interdisciplinary spaces

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Abstract: This paper aims to unveil some linkages between design and a social entrepreneurship process. To achieve this purpose, this analyses the key literature regarding social entrepreneurship and design. It introduces an abridged version of four case study resulting from a qualitative research conducted to a Chilean social business incubator and four social entrepreneurs. The cases serve as empirical evidence of the diverse and complex nature of social entrepreneurship. A data analysis introduces insights into how design is connected to the social entrepreneurship process. The insights presented are not determinative and show that design is used in response to the different challenges that social entrepreneurs encounter. These insights are used to create a framework that is to be employed as an analytical and reflective device to understand the social entrepreneurship process in practice and the different roles that design plays within it.

Keywords: Social Entrepreneurship, Design, Framework.

Designing Your Future - 21st Century Skill-Set for Industrial Designers.
The Case Study of Israel Design Field

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Abstract: This study focuses on the Industrial Design (ID) community in Israel in light of global shifts in the definition of the designer's role in the evolving business world. The study examines the relations between design and entrepreneurship, both in global and local context, as reflected in the professional skill-set of industrial designers in Israel. Just as there is a great value to Design Thinking in entrepreneurial ventures, there is also value in implementing entrepreneurial thinking principles in design processes. Entrepreneurship is integrated into design practice and Higher Education (HE), yet it is still perceived as a business-related education, rather than a required skill-set for innovative thinking. Evident efforts to top-down changes in local design HE is challenged by structural barriers. Therefore, this research leads us to developing a prototype that assists the empowerment of ID students as 'creative leaders' by using entrepreneurial thinking and supporting 'Life-Long Learning'.

Italian Yachts Restoration. Possible tools for the 'new' business of nautical heritage

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Abstract: In Italy, the 80s saw the beginning of a re-born interest in nautical heritage. Year after year, 'old' activities such as traditional shipwright skills and boatyards working with wooden boats started to be reintroduced to the Italian entrepreneurship reality. Their new scope was no longer the construction of new wooden boats, but the restoration of those considered historical or with cultural importance. Restoration is a practice aiming to secure the future of objects of cultural importance. Until today, wooden boats have been restored according to the project designer's sensitivities. Rules or general indications do not exist. Thanks to the tool of 'design thinking' this research arrives at the proposal of 'guidelines for boat restoration', with a multiple purpose: being a tool for any designer working on the restoration of boats; adding value to those designers' work; activating opportunities for new entrepreneurship; and developing old entrepreneurship realities according to present needs.

Keywords: Italian nautical heritage, design thinking, yacht design, guidelines, entrepreneurship development

Models of Collective Working. Insights on the Scottish Context

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Abstract: This paper presents a project – Collective Futures – a researcher-practitioner collaboration exploring the nature and models of creative collectives in Scotland through a design thinking approach. Collectives are proposed as a new way of working and an unintended stimulus for social change: reducing isolation, and empowering creative practitioners to remain within their preferred communities with access to personal and professional networks. Design thinking is connected to action research and is recognised as an enabler to embrace differing perspectives while exploring flexible structures that give a shared purpose for effective collaborative working within the creative and cultural sector.

Keywords: Creative Collectives, Design Thinking, Entrepreneurship

Design Thinking for Entrepreneurship in Frugal Contexts

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Abstract: Even if design is recognized as an important driver for innovation on a global scale, there are still many countries in the developing part of the world where design as a process for innovation do not play any significant role for businesses and society. There is however a growing interest in design as a resource for innovation in many developing countries, e.g. in Kenya, where these projects are taking place. The results illustrate how design can support a local network by establishing a co-creation process as the basis for innovations and entrepreneurship in a frugal context, the role and value of design thinking for supporting entrepreneurs. The experiences and learnings from frugal innovations are of equal importance as the process and mindset of Design Thinking. A new type of Knowledge Cluster therefore includes not only design knowledge and skills, but also frugal innovation and frugal criteria.

Keywords: Design Thinking, Frugal Innovation, Frugal Context, Knowledge Clusters

Designing in highly contentious areas:

Perspectives on a way forward for mental healthcare transformation

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Abstract: There is growing interest in service design to support transformation in mental healthcare. Early research in this area has shown some promising results, but has also revealed the contentious nature of this work. A better understanding of the complexity of design in mental health is needed to support the development of approaches that are appropriate for this context. As such, the aim of this paper is to examine areas of contention and related strategies employed when designing for mental health transformation. To realize this aim, a qualitative multiple case study of ten service design initiatives in mental health contexts was conducted. The analysis revealed five interconnected contentious issues: organizational constraints; ensuring meaningful participation; culture clashes; power dynamics; and systems approaches. These contentious issues are detailed and related strategies from various cases are put forward, providing a rich foundation for the ongoing development of service design approaches in mental health.

Keywords: Mental health, service design, participatory design, contentious issues, strategies

Designing better hip protectors: a critical and contextual review examining their acceptance and adoption in older populations

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Abstract: Hip fractures are a very serious condition in the elderly, greatly increasing morbidity and mortality. Hip protector garments, with integrated impact absorbing or deflecting pads, are known to help reduce hip fractures when worn by high-risk populations. However, uptake of these products is low. By investigating academic studies and sales and marketing literature, this paper provides a critical and contextual review of barriers to acceptance and adoption of hip protectors amongst older adults. This is part of a broader PhD investigation to establish how hip protection can be improved through human-centred design. Discomfort is the most reported barrier to acceptance although there are several more, including aesthetics and difficulty of use. Receptivity towards hip protectors is key to eventual compliance, and design criteria including aesthetics, convenience, comfort and cost should be as important as the level of impact protection to the hip joint.

Keywords: Hip Protector, Hip Fracture, Elderly, Garment Design, Human-Centred Design

Combining design research with microbiology to tackle drug-resistant infections in different home environments in Ghana: Challenging the boundaries of design thinking

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Abstract:
The aim of this paper is twofold. Firstly, to present design research work that crosses into specialist medical areas, in this instance that of antimicrobial resistance (AMR); and secondly, to contribute to the debate on the need for design-driven research to explore alternative ways of delivering healthcare by focusing on preventive design responses. These points are addressed in the exploration of an international design-led research project, Dust Bunny. The project uniquely combines design research and microbiology to provide an informed assessment of societal practices in domestic cleanliness and to co-create novel solutions that reduce infections in the home. The findings and experiences from this unique transdisciplinary collaboration (design, microbiology, epidemiology and social science) reveal several insights on the challenges and opportunities on challenging the boundaries of design thinking.

Keywords: Design for health, antimicrobial resistance, preventive design, global health, design thinking

Designed with Me. Empowering People Living with Dementia

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Abstract: This paper presents on-going research that adopts an open and truly collaborative approach to working with people living with dementia by recognising and utilising the inherent personal creative abilities that every individual possesses - no matter their cognitive ability. The research project entitled "Designed with Me", via a series of carefully developed innovative co-design workshops, supports people living with dementia to express themselves fully in "live" design collaborations. Every individual's input in this research is highly valued and is held in the same esteem as any other collaborator. In this project, participants become collaborative designers helping to propose possibilities, evaluate and select solutions, give their knowledge and skills freely, and generally make things happen. "Designed with Me" highlights clearly that people living with dementia can continue to make a significant contribution to society long after a diagnosis of dementia.

Keywords: Designed with Me, Designing, Making, Dementia, Empowerment

How smell can help visually impaired in health and well-being – a cognitive experiment

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Abstract: We studied smells, memory and cognition of the visually impaired, aiming to offer some new clues for improving their freedom and mental health by uncovering the relationship between the olfaction and memory of the visually impaired. We conducted three experiments: 1) whether smells can arouse memory, 2) smell memory and geographic cognition, and 3) application of smells into the design. It was found smell aroused the memory of the visually impaired and inspired their willingness to communicate. Scoring based on a scale implied they showed similar geographical cognition to most smells. The preliminary research & qualitative analysis was aimed to find out potential new directions for smell research design and underlie the next step research.

Keywords: visual impaired, well-being, smells, cognize, memory, Interaction design

Unpacking two design for health living lab approaches for more effective interdisciplinary collaboration

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Abstract: This paper outlines research that aimed to build an understanding of resonances/differences across cultural contexts related to two design for health living labs, one based in a hospital in New Zealand and one with a more community focus based in a University in the United Kingdom. A series of collaborative workshops during four exchanges were held in Auckland and Sheffield to unpack the approaches and projects of the two. Using the labs as case studies we explore how to best develop creative, dynamic and innovative approaches to developing new healthcare solutions. While the two labs operated in different contexts, we identified similar challenges when undertaking design for health projects, with respect to how to bring these different disciplines together for collaborative activities. The paper reflects on the findings of the study and ends with recommendations for future research and the development of strategies to support inter-disciplinary design for health collaborations.

Keywords: collaboration; agency; interdisciplinary; labs

Ethics by Design: Exploring Experiences of Harmony and Dissonance

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Abstract: The positioning of design research as a response to complex challenges across disciplines, underpinned by participatory approaches highlights both a growing awareness of the discipline, and the recognition that design can offer a new perspective for exploration and innovation. However, critical to successful adoption of design research methodologies is an understanding of ethical practices that are inherent within the discipline. This paper presents the findings of two participatory design workshops entitled 'Ethics by Design' which aimed to make visible the implicit ethical considerations underpinning the ethical practices within design research. Drawing on experiences of design researchers engaged in a health context, the workshops highlighted the challenges and underlying assumptions around ethics emerging from design research in complex contexts. This paper posits that the ability of the design researcher to identify and acknowledge their own position is critical to delivering rigorous and robust design research capable of enabling co-ownership and co-direction.

Keywords: Ethics, Participatory Design, Health and Care, Innovation, Transformative Change.

Analysis of the pilot survey INKLUGI about aging and disabilities to promote Inclusive Design in industry.

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Abstract: This study is part of the project INKLUGI. The main objective of the project is to create new tools that help to introduce Inclusive Design methods in the industry of the region of Gipuzkoa. To make companies understand the aging of the population as an opportunity for innovation and competitiveness is necessary to create new quantitative tools. The survey about disability and aging is the best way to gather data for a quantitative data base that will feed the future quantitative tools for Inclusive Design. In this study the process followed to carry out the pilot survey INKLUGI is presented. Then, the results obtained from the survey are analysed and discussed in a collaborative workshop with stakeholders. Finally, the contributions of experts from different sectors are explained.

Keywords: Inclusive Design, disability survey, aging, quantitative, exclusion

Rethinking how healthcare is conceptualised and delivered through speculative design in the UK and Malaysia:
A Comparative study

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Abstract: The paper aims, firstly, at presenting cross-cultural design-driven research responses that explore alternative ways of conceptualising the delivery of healthcare, through participatory speculative design. Secondly, it aims at offering a comparative study, which explores this approach in the theme of ageing in place, with different groups of senior citizens in the UK and Malaysia. In a series of co-design workshops, speculative design served as a safe and creative environment for participants in the UK and Malaysia to explore new ideas for health and wellbeing. Our findings reveal that aside from the high interest in healthcare demonstrated by participants, the feasibly of adopting speculative design as a tool to engage with vulnerable groups (in non-Western contexts) is supported. Moreover, evidence of how such an approach encourages involvement, gives voice and expanses imagination, could be adopted by policy-makers and governments to enhance engagement with hard to reach groups such as senior citizens.

Keywords: Speculative Design, Healthcare, Ageing, Design Policy, Malaysia, UK

Life Café. A Co-Designed Method of Engagement

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Abstract: The last decade has witnessed a demographic change on unprecedented scale - people are living longer and with more complex, long term conditions. This paper presents a programme which seeks to rethink how palliative and end of life care can be provided equitably, efficiently and sustainably for future generations. It explores the methodological approach undertaken by university researchers, to engage communities in conversations around a topic often seen as taboo. The community engagement focuses on understanding what is important to individuals in life, care, and end of life. A methodology, named the Life Café, has been developed to gather research in an informal manner within community groups and familiar environments. The Life Café comprises critical artefacts, activities and resources, co-developed with community members developed to answer the research questions. The Life Cafe has become a product that can be used across different services to establish what matters to individuals and enable difficult conversations.

Keywords: Co-design, artefact, end-of-life, conversation, taboo

Designing Cognitive Ergonomics Features of Medical Devices. Aspects of Cognitive Interaction

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Abstract: This research studies three areas of interest: Healthcare sector, the discipline of Cognitive Ergonomics and Design for Health with the aim of developing the guidelines for designing a correct physical and cognitive interaction with Medical Devices. Therefore, the analysis of Cognitive Ergonomics features was done that has been so far finalized with the first systematization of these features, that evidenced some issues and opportunities for design intervention. In particular, the features have been divided into two groups: rational and emotional aspects of cognitive interaction, where the latter introduces more questions than answers, however, the first 'layer' of design questions is proposed as the base for the future guidelines. This Ph.D. research is being conducted in collaboration with an Italian manufacturer of devices for neonatal care that provides a case-study for further testing of the research proposals and results.

Keywords: Healthcare, Cognitive Ergonomics, Rational, Emotional, Design Guidelines

Moving beyond an interdisciplinary paradigm

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Abstract: Our future requires collaborative minds to solve some of the wicked problems our global communities now face. Interdisciplinarity became the focus for design activity where two or more design disciplines come together to solve complex issues. Interdisciplinary activity suggests that this collaborative activity remains confined to one discipline arena, most often with participants remaining within their skill set, and does not promote cross boundary pollination. Transdisciplinary design activity however is defined as the collaboration of two or more disciplines where participants no longer restrict their thinking or activity to their specific skill set, suggesting that lines become blurred, merging skills together to achieve solutions to complex systems. This paper will discuss the impact of transdisciplinary design activity, between design and medical students, where they collaborated within a clinical environment to improve the patient experience. Through student reflections, it explores the impact of transdisciplinarity to facilitate transformative landscapes, improving the patient experience.

Keywords: Interdisciplinary, Transdisciplinary, Transformation, Design, Care, Empathy

Crafting Textile Connections: A mixed-methods approach to explore traditional and e-textile crafting for wellbeing

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Abstract: Textile making is known to improve wellbeing (Vercillo, 2012; Kenning, 2015) and according to Yair (2011), group crafting activities can also produce multiple therapeutic, cognitive and social benefits. By engaging in group crafts with textiles, individuals can give, be active, learn, take notice and connect with others – all factors associated with wellbeing (Aked & Thomson, 2011). However, as a relatively new phenomenon (Kenning, 2015) this has not yet been analysed in detail using wellbeing scales or matrices. This paper discusses three textile-based craft workshops as case studies where wellbeing factors pertaining to social interaction and connectedness were observed and measured. Workshops weremeasured quantitatively using the Warwick-Edinburgh Mental Wellbeing Scale (WEMWBS) and qualitatively, through thematic analysis of conversation. Our results align with related works, demonstrating an overall increase in wellbeing following participation in textile crafting and explores new territory for wellbeing studies.

Keywords: Textiles, E-textiles, Craft, Wellbeing, WEMWBS

New Domestic Healthcare. Co-designing Assistive Technologies for Autonomous Ageing at Home

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Abstract: Ageing is connected with increased chronic psychological and physical disabilities, which are today delayed to older ages than in the past. The constant growth in number of older people in our society creates a larger demand of goods and services related to home care, due to the willingness of the elderly to live at home remaining autonomous as long as possible. Using a Human Centred Design method, this research aims to support ageing in place and to extend independence of older people through appropriate technological strategies for families, reducing both costs and risk factors of caregiving. Quality Function Deployment tool and Co-Design technique are the main approaches that have led the design process, including older people in every decision-making step. The final result is an assistive IoT ecosystem, which provides at the same time a customizable healthcare service to the elderly and a home care management system to their caregivers.

Keywords: Inclusive Design, Elderly, Ageing in place, Assistive environments, Internet of Things.

Addressing stigma in the design of a physical device and digital app for pelvic floor exercises. Five concepts to increase women's health

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Abstract: Pelvic floor disorder is a common condition affecting up to a third of women and is exacerbated during pregnancy. While some commercial devices help women with their exercises, PFD is still a stigmatising topic. We followed a human-centred design approach to understand the stigma associated with PFD, develop design solutions, and evaluate our concepts. This paper reports on findings from our survey focusing on PFD stigma; our design development process, and the evaluation of 5 concepts consisting of a device and mobile application. We identified some promising directions for future designs. Our most successful device design offered the added feature of also being a sex toy, shifting attention away from the disorder, and disguising the device as a familiar object. Our findings indicate that for some women, empowering them with playful and potentially sexual designs is a promising way to reduce stigma.

Keywords: Stigma, design for health, interaction design, product design, user centred design.

Enabling people to lower barriers with a co-design prototyping approach: sex education for upper-elementary students at home

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Abstract: Through using prototyping as a communication medium in co-design, disparate participants may find common ground on how to deal with complex issues. Due to Korea's Confucian cultural society, there is a lack of conversation about sex between parents and children at home. Therefore, it is necessary to find a way to construct an atmosphere at home to talk about sensitive issues, like sex, especially through co-design. We conducted two co-design workshops by using prototyping as a 'Make Tools' medium: The first prototyping was for a storytelling booklet and the second one was for a board game, along with parents' guidelines. We found hindrances coming from parents in both workshops, showing parents' interventions and concerns over this sensitive topic, hindering children moving on with the sessions. However, insights into overcoming these limitations identify as follows. 1) Children's empowerment over parental interventions and 2) finding common ground to lower barriers among participants.

Keywords: co-design, prototyping, sex education

The Problem with Problems. Reframing and Cognitive Bias in Healthcare Innovation

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Abstract: Design Thinking (DT), well-branded in the world of innovation, is typically defined as a methodology for problem-solving stemming from the way designers think and do. However, from a cognitive science or social psychology perspective, DT can be viewed as a process for overcoming *cognitive bias* in decision-making (Liedtka 2015). The purpose of this study is to better understand how cognitive biases influence the way decision-makers frame problems and the impact of DT methods to *reframe* the problem. Specifically, this relationship was investigated through a comparative analysis of nine healthcare innovation projects and two in-depth case studies. Thus, asking (1) is the problem really what people think it is, and if not, why? and (2) which methods are most useful in exposing misunderstandings and reframing the problem? The cognitive difference between the original and the reframed problem is further propositioned; resulting in the theoretical concepts of *reframing distance* and *reframing space*.

Health and Wellbeing. Challenging Co-Design for Difficult Conversations, Successes and Failures of the Leapfrog Approach

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Abstract: Conversations are an everyday element of health and social care practice, and improving them could lead to widespread positive impacts on care provision. We present three initiatives to improve difficult conversation through three case studies, each using co-design to produce tools for later use by practitioners. The approach taken is knowingly risky, as tools can be difficult to co-design and difficult to encourage others to use, leading to failures as well as successes. Alongside specific empirical insights from the case studies we discuss the benefits of co-designing flexible tools for ongoing use and adaptation by practitioners, and the implications of this approach for the sustainability and impact of co-design initiatives.

Keywords: Co-design, Tools, Care Provision, Public Sector, Conversations

Uncovering Nuance: Exploring Hearing Aids and Super Normal Design

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Abstract: This paper presents initial research undertaken as part of an ongoing PhD project, with the aim to explore the lived experiences of hearing aid wearers. This research asks, how does the experience of wearing hearing aids differ across hard of hearing, deafened and D/deaf users? What decisions are hearing aid wearers making with regards to 'passing,' 'covering' and 'uncovering?' And in which ways does stigma affect these decisions? Exploring nuanced and complex attitudes towards hearing loss and D/deafness through observations and informal fieldwork and suggesting that a nuanced design approach may better reflect the attitudes and identity of wearers. Furthermore, future research will adopt a super normal design sensibility and craft practice as an approach to explore further research questions.

Keywords: hearing, hearing aids, super normal, design

The Soft Touch: Design vs. Disruption

Soft touch
n. A gentle way of handling someone or something.

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Abstract: Loneliness is a growing endemic social condition that can be deeply harmful to health and wellbeing, particularly for ageing populations, who, consequently, may be at greater risk of developing depression, Alzheimer's and cardiovascular disease (Campaign to End Loneliness, 2016). Contributing to a PhD study that employs a soft design approach towards connectedness – the antithesis of loneliness – twelve older adults were invited to experience an interactive e-textile prototype, the 'Dundee Conversation Quilt'. Designed by individuals with experience of loneliness to prompt dialogue and interaction, the quilt reflects some core values project participants have consistently identified as being key to social connectedness: identity, heritage and storytelling. Despite careful design and a soft touch approach, in this paper we will describe a situation where disruption, distraction and – at times – discomfort prevailed during a workshop where the Dundee Conversation Quilt was tested. Hosted by a local charitable organisation and up against adverse environmental factors including an unexpectedly hot climate and last minute changes to the workspace and facilitation team, this workshop presented challenges outwith the researchers' control, and to the potential detriment of participant wellbeing. We unpack this demanding workshop journey, reporting on the workshop design - its' successes in providing opportunity for connectedness, its' derailments - and the implications of these disruptions.

Keywords: Workshop Design; E-textiles; Participatory Design

Homeostasis sanatoris. A meaningfulness-driven product that stimulates physiological healing processes

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Abstract: Conventional medicine uses diagnostic techniques to identify and suppress symptoms to purport to heal, assuming symptoms as the whole disease. However, these techniques ignore the relationship between mind and body, and how emotions catalyze healing or illness. Therefore, we aim to develop a meaningfulness-driven product to trigger reflection upon illness, supporting healing processes from emotional and mental fields. *Homeostasis Sanatoris* is a balance generator object that facilitates dialog between patients and physicians using analogies. The analogies symbolize the process we live with disease and symptoms to recover the balance our body needs. We tested the product in therapeutic sessions with both, patients and physicians. The results were very positive, successfully the reflection took place in and every person that interacted with the product could identify what they need to find their own balance.

Keywords: Positive Design, Balanced, Design for health, Product, Healing

Falling UP to Recovery: co-created, artistic practice for holistic mental health care in Scotland

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Abstract: This paper focuses on Gugging's model of therapeutic care for mental illness. It introduces the constantly evolving concept of Gugging and its holistic methodology as a sustainable, humane, creative alternative to the predominant model currently adopted in Scotland. Primary research fieldwork is carried out through participation, residency and collaborative processes, in Austria. Gugging advocates an empathetic, person-centred model of healthcare connecting to principles of on-going design for mental health. The theme and concept of Gugging's process underpins the exploratory nature and creative processes of Falling UP, which itself is a unique, holistic creative intervention, constantly evolving, adapted and honed through practice-based doctoral research; offering a radical rethink of how mental healthcare can be conceptualized and considered in Scotland. In this paper, both Gugging and Falling UP are presented as integral to the lead author's ongoing recovery from mental illness and his ever-developing relationship to it.

Keywords: collaboration; community; mental illness; recovery; stigma.

Conversations between procedural and situated ethics: Learning from video research with children in a cancer care ward

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Abstract: Since the turn of the century we see a renewed interest in the impact of hospital environments on children's well-being. With policy largely built around adult assumptions, knowledge about these environments from young people's perspectives is limited. Participatory visual research is considered helpful to explore people's perspectives in other than solely verbal ways. Conducting it with children in sensitive and hard-to-enter contexts like hospital wards, however, poses important ethical questions. Discussions tend to contrast procedural ethics with ethics in the field, showing how the former are unfitted for this kind of research. This paper takes a more constructive approach by reflecting on what we can learn from these ethical encounters while preparing and conducting a pilot study. We argue that exploring, rather than closing, the experienced gap between design research and healthcare ethical protocols establishes a shared space of reflection that offers a stepping stone to link both.

Keywords: Research ethics, Children and youth, Cancer care environments, Participatory video research, Reflectivity

Value Creation through Service Design in a Healthcare Environment

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Abstract: After cancer diagnosis, patients experience shock, anger and fear which makes the gathering of the information that would help to understand the upcoming life a difficult task. For most patients, their healthcare team is the primary source of information; however, they feel that their information needs are unrecognised or unmet. Based on this perspective, this study aims to explore how design could contribute to reducing the stress level of patients related to the information-seeking after being diagnosed with cancer through a human-centred design process via following a bottom-up approach in collaboration with a healthcare institution in Eastern Europe. The study shows that having a human-centred design process followed by a bottom-up approach could help design researchers and developers to challenge the hierarchical situations in order to create solutions focusing on patients who could be in quite vulnerable situations when they are just diagnosed with cancer.

Keywords: healthcare services, prototypes, human-centred design, patient information package, emotional distress

Home healthcare devices. Challenge of CPAP design for effective home treatment

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Abstract: *Background*: Continuous positive airway pressure (CPAP) is among the most popular treatments for obstructive sleep apnea (OSA). Despite the great variety of devices and accessories available in the market, they still have an unfavorable image, poor adherence and subjected to complaints from patients and families. We reviewed available devices, identified problems and requirements, and suggest design concepts that may improve patient satisfaction, adherence and quality of life. *Methods:* Data were collected from commercial internet sources, scientific publications and observations. Comparative analysis was used to evaluate the components of the CPAP system, the profile of CPAP users and the treatment environment. *Results:* Main results indicate obstacles in the image and appearance of CPAP as a daily, life-time utility, in user capabilities, in performance and adaptivity to bedroom design. *Conclusions:* Adopting a user-centered design rather than an engineering focus will alleviate psychological issues and potentially increase adherence, satisfaction and the overall "user experience".

Keywords: Homecare; Medical Equipment; User-Centered Design; Adherence, Wellbeing

Ethics and Risk. Doing Design Research with People in Care Homes

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Abstract: Drawing on doctoral research that is currently in progress within two care homes for older adults, this paper makes an argument for participatory approaches to design research and explores how a situated and social understanding of risk is required to develop an ethical approach to design research in this field. Within this it is argued that researchers working with marginalised groups should not only be aware of the risks that group might face but be sensitive to potentially competing perspectives on risk. Secondary literature encompassing design as well as health and social care is used to frame some of the issues arising in the fieldwork before moving on to develop insights about the potential for design to provide an 'ethic of care' that can respond to tensions around risk and potentially recast these as a creative and constructive opportunities.

Keywords: care home, ethics, risk, participation, older people

Project scale and the wicked problem in Fourth Order design

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Abstract: User-centred design evolved in the context of product design – projects with client-defined goals and comparatively short lead-times (Sanders and Stappers, 2008; Herriott, 2014). These conditions are not standard in product design. Yet the need remains to involve users appropriately and effectively (to do with matters of equity) in larger scale projects such as transport and architecture. To explore the effect of scale and duration on user-centred design, this paper compares cases of hospital design and public transport design. This paper has synthesises empirical studies of user involvement in public transport and hospital design. The paper draws comparisons between large design projects and case of "wicked problems". Using this link, the paper argues for the reasons outlined in Rittel and Webber (1973) that large systems projects are not readily amenable to tackling using standard design processes. The paper then tries to show that the success of design approaches in the first three orders of design (Buchanan, 2001) are not automatically transferrable to what Buchanan terms Fourth Order design.

Keywords: Accessibility, Design Process, User-Centred Design, Public Transport, Architecture

User Experience of Brazilian Public Healthcare System. A case study on the accessibility of the information provided.

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Abstract: This paper describes a preliminary study into user experience of Brazilian Public Healthcare System - Sistema Unico de Saúde (SUS). It focuses on the accessibility of the information at three stages: information delivered by the doctor to the patient; the information available for the patient outside the clinic; and the type and amount of information the patient has to handle with meanwhile being diagnosed. This was based on a two-month ethnographic study of a patient diagnosed with liver cancer. The study takes into account the patient's condition, his age, and his partner's age, aiming to highlight challenges and gaps in the process, especially those extra demanding for elderly people. The results indicate that mapping the user experience and the key stages throughout the process are useful to outline and understand accessibility issues. The findings highlight opportunities in the process to design better interactions and ways to deliver information, considering elderly users needs.

Keywords: SUS, service design, patient journey, inclusive design, patient experience

Debate through design. Incorporating contrary views on new and emerging technologies

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Abstract: Emerging technologies have the potential to affect our minds, bodies, and society on a fundamental level. Many current decisions related to technology development have far-reaching social and ethical implications, yet societal debates on the issue rarely move beyond a discussion of (undifferentiated) utopias and dystopias. This paper presents a methodological approach in which design fiction is used to prompt societal actors to engage in debate about the social and ethical implications of advances in technology, and the creation of socially desirable futures – thus shedding new light on technological development from a societal perspective. Within a theoretical framework that draws on a combination of theories from science and technology studies (STS), design research, participatory technology assessment (pTA) and science communication, and on the basis of practical findings from interdisciplinary research projects, we show how design fiction can be used to effect "debate through design".

Keywords: Design Fiction, Public Engagement in Science, Emerging Technologies, RRI

Social packaging. Design for wide sustainability

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Abstract: The contribution intends to present a research experience developed by three players in academic, commercial and social fields who, working in collaboration, have created the conditions to produce new packaging systems for recovered and regenerated household appliances, in order to reintroduce them into the market. The action is carried out within the Ri-Generation project, activated by Astelav and Sermig (Turin, Italy), aimed at recovering a large number of abandoned appliances in order to prevent the formation of waste in landfills, offer a new life cycle and new value to used products, foster new economies and create job opportunities involving marginalised people in the regeneration operations. The spirit of the Ri-Generation project is maintained in the conception of the packaging, which is produced by transforming and assembling abandoned clothes recovered daily by Sermig. The resulting soft mat can be easily used to wrap the recovered washing machine and protect it during transport to the buyers' home.

Keywords: Packaging, re-use, Ri-Generation, recover, new economies

Co-living as a means to re-engagement.
A literature review

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Abstract: This paper presents a literature review of the field of social innovation and more specifically, using collaborative services to provide meaningful interventions for people in precarious living conditions. The way that we live in the city is shaped by the political and ideological assumptions. People who find themselves without a roof are those who tend to be more open to alternative ways of living. The unique co-creative perspective of social innovation provides a framework that can enable the re-engagement of people living in the periphery and their inclusion in every step of the decision-making process. At the same time the co-creation of new ways to live together can act as a catalyst for a more widespread societal change.
Increased participation has the capacity to lead to a new kind of social policy, a more inclusive, bottom up democratic policy. In addition, the housing context offers a path towards a more resilient and sustainable transition towards societal interpersonal and environmental sustainability.

Keywords: Co-Living, Social Innovation, Socially vulnerable people, service design, collaborative services

Geographical Context Influence on Co-design Practice Between Indonesia and the UK Context

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Abstract: This paper describes and evaluates experiences of co-design practice from two different contexts, Indonesia and the UK. It draws on multiple case studies consisting of three co-design projects in each context. The focus of discussion is to better understand the influence of the geographical context on the application of co-design and how it informs the characteristics of the co-design practice. This comparison of practices in both contexts has been conducted through examination of their respective processes in relation established criteria. The study in the Indonesian context finds notable effectiveness in its support for collaboration and flexibility, while the decision-making process appear less democratic. By contrast, in the UK context effectiveness is identifiable in almost all aspects of the process. The paper concludes with a discussion of the similarities and differences in the characteristics of co-design in both contexts.

Keywords: Co-design, Context, Contextual Factor, Characteristic

Collaborative governance in the sharing economy. A case of free-floating bicycle sharing with visualized analyzation

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Abstract: A business model of sharing economy has rapidly developed. It is predicted to profoundly influent the society. However, because imperfect management might ruin its operation and future growth, the sharing economy model is rife with conflicts and paradox in terms of logic, boundary, and influence. Taking the Free-floating bicycle sharing (FFBS) as an example, although it is becoming more and more popular in many big cities, the service has led to many problems, including road congestion, parking disorder, and mismanagement of bicycle information. As a result, its sustainable development is severely affected. In this study, we used FFBS as a case study to investigate the relations among government, companies and users. We interviewed varies stakeholders and discussed their different perspectives of collaborative governance. It showed that the parking location, usage frequency, number of parked bicycles, and bicycle health status could be used as indicators to monitor the service situations. We also identified that the wanton occupancy of public space was the major problem of FFBS. To address these issues, we developed a real-time information management platform with information visualization, aimed to help the government, the company, and the users to gather the bicycle information and coordinate their sharing usage. This platform could promote the sustainability of FFBS system and foster the development of other forms of sharing economy in the future.

Keywords: Sharing economy, Bicycle-sharing, Coordinated management, Sustainable design, Visualized analysis

Investigation into how each stakeholder plays a role at different levels of granularity to realise a long-term service design project

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Abstract: A 5-year service design project, 'Digital Detox', aims to develop a service business model and build a platform for service content that helps to prevent young teenage students become addicted to using smartphones. This paper aims to explore 1) how tasks are undertaken in each year's process and 2) depending on each year's process' phase, what roles stakeholders and designers play to realise the service and its system in the market. Through investigating each year's phase, we found that the service agency's authority as project manager was shared with diverse partnerships to embody the service design concept and commercialise the service. The partners' roles can be divided into four types: 1) an informative role to evaluate the suggested prototype, 2) consultative and 3) participative roles to engage with users and embody an elaborate plan, and 4) a masterful role to lead a certain activity which requires partners' professional knowledge or capabilities.

Keywords: Internet detox, Co-design, Stakeholders, Long-term project

Hybrid zero waste design practices. Zero waste pattern cutting for composite garment weaving and its implications

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Abstract: This practice-based design research explores methods of eliminating textile waste through utilising zero waste pattern cutting to expand the outcomes possible through composite garment weaving and speculates as to the implications for the wider industry and society. Employing a hermeneutic phenomenological approach, I tested known strategies in the context of industry and responded with new emergent strategies to the challenges that arose. The findings that emerged from the iterative design practice, and surrounding discussions and reflections, inform the experimental design work that follows. It is this experimental 'future-making' that is the focus of this paper, which outlines foundational pattern cutting theory and methods for an emerging field – composite garment weaving – as well as findings relating to the impact and use of technology in the fashion industry while bringing into sharp relief the inherent conflicts that exist within the fashion system.

Keywords: Zero waste design, Composite garment weaving, Technology, Circular design, Sustainable fashion

Counter-narratives Towards Sustainability in Fashion. Scoping an Academic Discourse on Fashion Activism through a Case Study on the Centre for Sustainable Fashion

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Abstract: To counter the mainstream fashion system, which is proving unsustainable in terms of autonomous livelihoods, cultural heritage, social equality, and environmental stewardship, some designers are playing an activist role, challenging the *status quo* and activating positive change. With this in mind, we have embarked on an on-going research project aimed at exploring ways in which design activism can create counter-narratives towards sustainability in fashion. This paper explores these ideas through a case study focused on the Centre for Sustainable Fashion (CSF). Through semi-structured interviews and a co-creation workshop, we mapped out examples of work undertaken by CSF members, and elicited their contribution to building a transformed fashion system. Hence, in this paper we articulate the diversity of roles, values, skills, and methods that fashion activists can adopt, as well as some of the challenges and opportunities for designers and researchers in transforming the fashion system towards sustainability.

Keywords: Design activism, Fashion design, Sustainability, Social innovation

Traditional Maker Practices and Sustainable Futures. The implications of expertise

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Abstract: This paper considers the contemporary position of traditional maker practices and their relationship to sustainability. It outlines the basis of the approach and insights from the field, and offers a range of initiatives where design can make a positive contribution to traditional production. Traditional maker practices are in steep decline in the UK and internationally; the kinds of knowledge promoted and valued in contemporary society tend to be at odds with those inherent to these kinds of practices. The paper considers the inadequacy of purely theoretical forms of knowledge and demonstrates the importance of values-guided practice, experience, skills, and tacit and situated knowledge. It shows the important links between traditional practices, sustainability and place, and, by citing a range of initiatives around the world, proposes directions for a more constructive way forward for small maker practices rooted in tradition.

Keywords: Maker practices, tradition, sustainability, design

Living Design. The future of sustainable maker enterprises: a case study in Cumbria

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Abstract: This paper presents initial findings from *Living Design,* a project supported by the UK's Arts and Humanities Research Council. The research examines small and micro-enterprises in Cumbria, UK, and the potential for design to make a contribution to their sustainment and flourishing. The paper presents research carried out with enterprises in Cumbria, who use wool as their main material. We present three case studies of makers who create beautifully designed, wool-based goods and whose practice include the whole cycle from sourcing fleece locally and manufacturing of their products, to design, branding and retail. We explore how the enterprises exemplify sustainability principles and their contribution to a circular economy. We present our findings and the concept of *Located Making* - purposeful goods whose design, production or use is dependent on place - which is informing the development of guides for enterprises, researchers and organisations to embed sustainability principles into their practices.

Keywords: Sustainability, maker-enterprises, design, craft

Co-designing Pathways to Opportunities for Young People in the North West of England

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Abstract: This paper presents ongoing research from the first of a series of projects examining how collaborative design approaches can raise aspirations and increase opportunities for people throughout the North West of England, in support of the UK Government's Industrial Strategy. The paper presents a case study where design practitioners and youth workers have worked together to co-design a prototype for an intervention that aimed to foster positive engagement between young people and businesses in Burnley in the North West of England. The paper outlines a number of insights that have emerged from observing and participating in the co-design process including the importance of trust in partnerships, skills and learning of the team, steps needed to sustain the project, and the challenges and opportunities of co-design. The paper concludes on how a "place-based co-design approach" may potentially contribute value to more resilient and sustainable communities.

Keywords: co-design, social change, sustainable communities, place-based, young people, aspirations

Slow knowledge in the 'real world'. Using *slow practice* to actively engage commercial collaborators in doctoral research

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Abstract: Slow knowledge in design thinking and practice has potential to create value in organisations outside of the academic and artistic settings. However, its adoption is challenged by ideological tensions with the imperatives of the commercial context. This article reports on part of a practice-based doctoral research project aiming to introduce this theory into the commercial design context. The six slow design principles provide a useful framework, whilst the slow practice tools help negotiate the engagements. Preliminary findings indicate arenas where the introduction of slow knowledge can create new value for commercial organisations. This article focuses on the methods and tools employed in overcoming the challenges of introducing the theory into this setting, and conducting effective collaborations to reveal potential benefits. The mind-set of the researcher-practitioner plays a significant role in negotiating access to people and resources, and negotiating value for both the collaborator and the research imperatives.

Keywords: slow knowledge, slow design principles, negotiation, strategic value, humbleness.

Bridging the double-gap in circularity.
Addressing the intention-behaviour disparity in fashion

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Abstract: The contemporary fashion industry is a broken system in need of reform, moving away from a dated linear model to adopt principles reflective of modern societal challenges. Through initial explorative studies and a thorough literature search, a fundamental engagement gap with principles of circularity has been identified, which continues to challenge the application of sustainable innovation methods. This paper focuses on the role design can play in the application of a circular model through product-life extension strategies. A multiple-stakeholder perspective was adopted during data collection, with a range of qualitative methods utilised through the engagement with both consumers and companies. Conclusions support the need to consider design as a key tool for change, with methods such as co-creation and participatory design facilitating greater awareness levels in consumers. A holistic approach to responsible action and an increase in product value can facilitate a move towards a circular model for fashion

Keywords: Circular innovation, design for longevity, intention-behaviour gap, fashion product lifecycle

Systemic Design for territorial thinking.
Circular urban transitions for post-industrial cities

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Abstract: Nowadays cities are pushed to transform drastically and faster their urban-fabric to cope with the demands of the market, this acceleration has resulted in the rise of more post-industrial cities. On that complex scenario, how can a territorial thinking in post-industrial areas foster Circular Economy (CE) frameworks to address the current environmental and economic challenges of society? Through this paper is intended to examine the case study of the post-industrial area of Mirafiori sud in Turin, Italy, to expose how the Systemic Design approach allows a wider examination of post-industrial areas to promote CE strategies that can generate a sustainable consumption of local resources and services fostering urban transitions. Endorsing the Systemic Design approach as an expertise that provides a holistic overview, within a transdisciplinary method brings together governments, industry, and citizenship.

Keywords: Systemic Design, Circular Economy, Urban Transitions, Post-industrial, Sustainable Development.

Neo-Local design. Looking at 'our local contexts' as potential resources

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Abstract: Our research efforts in design are inherently linked to our peculiar standpoint: Sardinia, the island in which live and work. Our region presents in fact a set of conditions that, we believe, can make it a working laboratory for exploring new development models, investigating the power of design and innovation to combine local identity and knowledge, contemporary needs and sustainability. A complex layering of specific historical and geographical facts have contributed to giving shape in Sardinia to a context which is quite unique in the whole of Europe. Over the last few years, this lead us to develop 'Neo-Local design', a concept about exploring ways to combine the potential of design as an innovation force with the values and skills of the local dimension. Through the discussion of some experimental projects we have carried out recently in our Design School, we wish to present our very specific point of view within a broader emerging debate. The paper will focus on new ways to interpret elements such as local knowledge and culture that we though were lost by the effects of the simplification of modernism in the first place and, more recently, by the homogenization of globalization, and that are instead making today place for themselves as valuable agents in the rethinking of the contribution of design to our society.

Keywords: neo-local design, design for crafts, social innovation, circular economy

Can we help as designers to build relevant spaces for meaningful dialogue through storytelling as a tool for local empowerment? A case of study in the Colombian Pacific

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Abstract: Can this space help people to appropriate their personal stories and jump to community stories? In this project, participate artisans linked to Artesanías de Colombia in Colombian Pacific Coast, who were given the opportunity to tell their stories and to sit down and talk. The most powerful element of the project was the impact that those stories had within each community and how personal experiences leapt into their common history. This became a space to express the human side within the community and a stage to participate and reflect on the being and doing in a way that had not been done before. This experience allowed people to see the narrative and the power of personal stories, inside and outside the community that lives it and shares it, made possible to evidence the important responsibility and power that design interventions have in building a desirable future through human connection.

Keywords: Community, Collaboration, Empathy, Personal narrative, Narration

Craft and Design Partnerships in the Chilean Context. A Critical Perspective

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Abstract: This research centres on the complex relationship between Traditional Craft and Design within the Chilean context. Actions of association between artisans and designers have been overall, positively recognised. However, for many artisans, these associations are not considered creative collaborations but productive participation, insomuch as they perceive being used as a mere workforce, being excluded from creative and reflective processes. Consequently, conditions are created that accentuate an asymmetric power relationship. The paper discusses the case study of current partnerships between artisans and designers in basketry communities of south-central Chile, analysing data gathered on a recent period of fieldwork. The insights are focused on the implications of designers' intervening role, aiming to reflect on its political and ethical dimensions. The paper is part of an on-going PhD research.

Keywords: Craft and Design, Collaboration, Local Production, Cultural Narratives, Chile

Design Thinking for Progress. Initial insights from an evolving design-led business support programme for Scotland

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Abstract: This paper provides a reflective and discursive overview of 'Design for Business' - a program uniquely positioned within V&A Dundee, a Design Museum – as a beacon for design-led business innovation. The paper is divided into two parts; the first contextualises the programme by providing an insight into the journey of co-designing, developing and piloting content within the national business community. The second section focuses on two case studies, one of a city council and the other of a small business, to demonstrate how their experience has impacted implementation of Design Thinking for Progress. The research expands upon these insights to conclude with five emerging design principles for Design for Business and makes recommendations for how they will be explored to help shape business, industry, and the public sector for positive social and economic outcomes in the future.

Keywords: design thinking, social innovation, business, sustainability, knowledge exchange

Addressing the Dialogue between Design, Sorting and Recycling in a Circular Economy

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Abstract: What kinds of implications does 'design for recycling' have for the designer's role and practice in the context of textiles and fashion? In this paper, we approach this question by discussing the problem of low textile recycling rates alongside a disconnection between clothing design and textile recycling. Qualitative interviews with design, sorting and recycling experts were conducted to gather insights into the challenges and requirements of closed-loop recycling. The research findings underline the importance of an active dialogue between these stakeholder groups, which calls for novel ways of sharing knowledge of the latest advancements in sorting and recycling technologies. In addition, the study brings forth the priority order of design considerations and proposes 'design for sorting' as a new strategy for textile circularity. The paper contributes to the ongoing discussion on design practice in a circular fashion system and the required changes in the mind-set of the entire industry.

Keywords: Circular economy, Clothing design, Design for recycling, Textile recycling, Textile sorting

To keep, or not to keep? That is the question. Studying divestment from a cross-cultural approach

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Abstract: The aim of this paper is to present preliminary findings of a study that is focused on divestment, its elements and the relationship with sociocultural context. Divestment is a concept that comprises those activities that include emotional and physical disposal of material possessions. This paper explores divestment within the context of sustainable consumption, as well as the potential for design disciplines to contribute to the creation of new solutions for the development of sustainable communities. The research was carried out within a cross-cultural framework acknowledging the relevance of contextual and cultural factors involved in the divestment processes: this was accomplished by comparing two countries; Mexico and United Kingdom. This work can contribute to design interventions to affect divestment decision-making process by identifying culturally dependent and independent elements that can impact the pre and post-consumption stages. The outcomes also enable ways of creating and promoting new commercialisation channels.

Keywords: Divestment, Sustainable Consumption, Design, Cross-cultural

"Use what you have to secure what you have not"[1]. On Design *for* and *from* Autonomy

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Abstract: This paper proposes a modality for engaging communities through design that is for, and from, autonomy. I will start by situating my experience using design in the social sector and introducing the concept of Autonomous Design, as proposed by Arturo Escobar. I will then unpack the three beliefs that Escobar says are historically embedded in the mainstream practices of design, to critic them and propose alternatives. I will then move to interrogate, by reflecting on an example from my own practice, how design could change, ontologically, when we move from a needs-based approach to one that focuses on strengths in groups and communities. I will then conclude by proposing a way to frame the design work with groups and communities, inspired by the work of Escobar.

Keywords: Autonomous Design, Design for Communities, Asset-based

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[1] This is a quote taken from a paper from Alison Mathie: "Does ABCD deliver on social justice?" from the Coady International Institute

Collaborative Circular Design. Incorporating Life Cycle Thinking into an Interdisciplinary Design Process

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Abstract: To evolve fashion and textiles within the circular economy an interdisciplinary approach encompassing a range of life cycle perspectives is required, facilitating this collaboration requires new thinking and tools. The research presented in this paper was explored through a European Union Horizon 2020 funded project, Trash 2 Cash (T2C), where collaborative 'life cycle thinking' (LCT) tools were developed to integrate multiple expert perspectives within the design process. The research positioned material scientists, industry stakeholders, consumer behaviour and Life Cycle Assessment (LCA) researchers into the heart of an iterative design process, tools were developed between and tested through consortium workshops over a 21-month period. Several key findings proved the value in the use of these interdisciplinary LCT methods, alongside new insights into barriers and opportunities for future circular material developments. Designing tools for collaborative research and the sharing of knowledge in this context was instrumental in helping to promote social exchange and the building of communities within the project and beyond. This work provides an important basis for understanding how to bring the theory of circularity into a networked industry practice.

Keywords: Circular economy, textile design research, collaboration, inter-disciplinary design tools, material recovery

Building Bridges. Design Researchers Making Podcasts to Support Internal Collaboration in an EU Horizon 2020 Scientific Programme

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Abstract: This paper argues the need for material design researchers to take risks; to work beyond the confines of their usual disciplinary remit. It proposes that the use of a podcast-first approach for a communications work package helped to build the collaborative relationships between scientists and other experts, in a research programme which had multiple trans-disciplinary challenges. The argument presented here is for textile design researchers to take a risk and work *aurally* as well visually and in written form, to create impactful practices. The paper analyses a podcast series made within a circular design project, using feedback from partner questionnaires to reflect via an action research framework, to ascertain how the episodes progressed the collaborations; *building bridges* between partners. The paper concludes with recommendations for how making podcasts can be used to build more successful collaborative projects, as well as benefitting the expanded practice of design researchers in social contexts.

Keywords: textile design research, communication skills, podcast-making, supporting transdisciplinary collaboration, circular economy

Designing an Appropriate Technology for Revitalising Traditional Craft Practice. Case study: Indonesian Stitch Resist Dyeing

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Abstract: This paper presents initial findings from an ongoing research project that explores possibilities for design and technology to contribute in revitalising traditional Indonesian stitch resist dyeing craft practices. The custom of Indonesian textile making has been mostly based on culture and tradition. In recent decades, the Indonesian traditional textile craft practices have transformed into producing commodity products and have shaped new culture of traditional craft practices. The study was conducted in three locations in Indonesia with an ethnographic approach, then the findings were analysed in accordance with established revitalisation strategies taxonomies and appropriate technology frameworks. A simple and individual tool with low cost multipurpose technology is recommended to improve the pattern quality and consistency as the main focus on revitalising the Indonesian stitch resist dyeing craft practice. This will preserve the existing working culture and minimise the internal risk factors whilst also being more sustainable in the long term.

Keywords: appropriate technology, craft industry, traditional textiles, stitch resist dyeing, Indonesia.

Spilltime: Designing for the relationship between QS, CO2e and climate goals

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Abstract: In order to deal with major climate challenges, different climate goals have been set. These goals are on an abstract, political level, making them difficult to understand for citizens. This is a problem, since in order to reach a sustainable society, all layers in society should be involved. We present a design process, in which we made invisible carbon emission goals tangible so that citizens can relate to them. By extracting different modes of carbon footprint feedback and translating those into a network of objects, we have provided an alternative viewpoint on how to involve people into understanding complex data. By giving different modes of feedback, people can find different ways to relate to the data. This way, the designer provides the tools, but people can use it to shape their own understanding. We consider this approach relevant in empowering citizens to voice their concerns in the climate debate.

Keywords: IoT for Empowerment, Climate Debate, Data, Technology, Designing for Citizens, Multi-modal Design

Considering Haptic Feedback Systems for A Livable Space Suit

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Abstract: The paper explores protective equipment for work in extreme environments manifested in a proposal for a haptic feedback system for astronauts. It follows the thesis that the safety of astronauts wearing Extra-Vehicular Activity (EVA) suits, whether in space or on planetary surfaces, is connected to their ability to interact with their environments, their equipment and suits, and their coworkers. The project emphasises the use of new technologies to enhance the quality of said interactions. Focusing on manned exploration and construction activity in space, qualitative research methods are employed to gain an overview of the factors that dictate work in space, endeavours in design and architecture for space, and research into the ways humans interact with their surroundings. Lastly, a conceptual prototype was made to explore the possibilities of exploring a language of haptic feedback to complement other systems and to mediate the sensory filters imposed by the modern space suit.

Keywords: Haptic, Extreme Environments, Space, Personal Protective Equipment

Data as a medium for inheritance and creativity of traditional design. A case study on data-driven modern creative design of ancient Chinese catering utensils

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Abstract: Traditional handicraft design, nowadays, is regarded as the inheritance of traditional design culture in modern times. However, due to the gaps between traditional design and modern design, the products of modern design are limited to the superficial cultural exhibition but lack practical cultural connotations. Regarding the gaps under the design context in China, we proposed a strategy of data-driven traditional design innovation. In this case study of ceramic footed cups from Yuan Dynasty, we elaborated the traditional craft graphic quantification method based on data analysis and identified the deep associations of design morphologic data of footed cups with the modern design knowledge and traditional cultures. Based on the study, we concluded that data are the key medium that integrates the gaps between traditional design and modern design. Finally, the models of data-driven traditional design innovation were summarized, and a design program based on data science was proposed.

Forget the Singularity, its mundane artificial intelligence that should be our immediate concern

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Abstract: Fuelled by Science Fiction and the pronouncements of Silicon Valley gurus such as Elon Musk, the 'Singularity' is arguably the biggest geek myth of our time (Modis, 2006) and is distracting us from addressing the numerous problems emerging with the increasing use of Artificial intelligence (AI). Artificial General Intelligence (AGI) is often perceived to mean super human like intelligence such as the ones depicted in movies like *Her* (2013) and *Ex Machina* (2014). These anthropomorphic representations of AI besiege our attention away from the very real threat of biases introduced through Machine Learning (ML). In this paper we will consider whether current practices within Human-Centred Design (HCD) permit designers to consider interactions and services in which non-human algorithms play a significant role and consider how approaches inspired by Object Oriented Ontology (OOO) may offer new perspectives for framing design activities concerning AI.

Keywords: Object Oriented Ontology, Machine Learning, Artificial Intelligence, Biased Algorithms

Beyond Average Tools. On the use of 'dumb' computation and purposeful ambiguity to enhance the creative process

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Abstract: In the early phases of the design process, embracing chance intrusions, seeming irrelevance and ambiguity can lead to considering concepts in different ways and provoke new ideas. However, the computational tools we are increasingly using in these phases value efficiency over serendipity; technologies whose foundations are an average. This paper presents a 'Beyond Average' approach that was used to develop two tools that use 'dumb' computation and purposeful ambiguity to enhance the creation of novel ideas. Results from studies using the tools in a design task show that computational tools with a medium level of contextuality and a higher level of interpretability can positively influence the creation of new ideas. Discussions about the role of computation in the early phases of the design process suggest that tools with higher levels of creative agency can contribute to the designer's creative agency and become a more natural partner in these activities.

Keywords: Computational design tools; artificial intelligence; creativity

Aural Textiles. Hybrid practices for data-driven design.

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Abstract: This paper explores the developing co-creative relationships that arise through integrating digital making and data-driven processes as inspiration within collaborative distributed networks of design and making. It draws upon a year-long case study of landscape sound digital pattern design with a group of textile practitioners from across Scotland. The aim is to understand how these collective 'hybrid ways of making' between digital data-driven design and analogue maker impacts the overall democratisation of textile design and manufacturing and influences the makers' practice.

Keywords: Co-Design, Data-driven design, textile patterns, distributed making

Using Twitter Bots to Critically Question the Belief Systems of College-Aged Republicans and Democrats

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Abstract: This study provides a theoretical and philosophical account of using Twitter bots to better understand the current attitudes of college-aged Republicans and Democrats. By comparing an in-person debate to the output of four Twitter bots, three emotional wedge issues were identified: universal healthcare, immigration, and gun control. Using content analysis, a correlation arose between the in-person and online frequency of the appearance of these wedge issues. Not only was there a correlation between the frequency of these wedge issues, but also the partisan attitudes about them. This indicates that, even though the bots offer fictionalized accounts, they can begin to accurately represent the attitudes of the real groups they are affiliated with.

Keywords: Twitter Bots, U.S. Political Systems, Democracy, Belief, Authority

Networking with Ghosts in the Machine.
Speaking to the Internet of Things

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Abstract: Our increasingly technologically-mediated world continues to pose challenges for design. Considering these we suggest that the digital products and services that surround us are haunted by 'ghosts in the machine'. These spectres bridge the physical with the digital, they broker competing relationships, and live among streams of data which cohere as algorithmic oceans causing precipitation of physical agency. Cast in this light, the ghosts in the machines of modern networked technologies represent aspects of designers' challenging relationships with the products and services they create. An emerging body of Post Anthropocentric theory offers conceptual 'jumping-off' points to engage with these challenges. In this paper we describe experiments that reflect and build on these theories. Through these we explore the possible foundations of accessible heuristics to aid in purposeful designerly apprehension of the difficult socio-technical complexities that are common among 21st century technological assemblages.

Keywords: Post Anthropocentric Design, Internet of Things, Object Oriented Ontology, Animism, Carpentry.

Design Research through simulated social complexity. An agent-based proposal to the construction of design knowledge

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Abstract: Based on the premise that human agency is shaped on the interaction with others, and at the same time it is affected by norms, cultural membership, and non-human agents with an equal or greater impact on the way humans behave, we introduce a design theoretical framework that looks beyond human-centered models to reveal the interrelationship between artifacts, social models and innovation. We regard norms as cultural models consequence of situated interactions between human and nonhuman agents. Borrowing computational tools from the social sciences used for the study of the networked behavior in artificial social systems we propose the inclusion of Agent-Based Modeling and Simulation (ABMS) in the design researchers toolbox. Through two examples we illustrate how ABMS serves as a tool for experimenting with models of designed artifacts as it carries the potential of testing the effects of design interventions at the micro and macro level on collective behavioral patterns. We conclude with an invitation to the design community to explore this promising path of research.

Keywords: Agent-based simulation, Norm centered design, Artificial societies, Emergent organization, Design research.

Cyborg-Computer Interaction.
Designing new senses

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Abstract: Cyborgs are among us. Integrating technology with the human body is not science fiction anymore as people started to apply various devices into their body to increase their abilities and senses. Although ethical debates on improving human abilities continue, technological developments have made devices that enhance human capacity small and accessible. Previous studies discussed cybernetic organisms (cyborgs) from an anthropological, sociological, bioethical and technical perspective. Although the interaction between cyborgs and the computers that are extensions of their bodies is crucial, there are few discussions on how to design new abilities and senses in cyborgs. Before describing a design guideline for cyborgs, we need to understand the concept of the cyborg, its characteristics and design potential. This study examines the previous definitions of cyborg to explore the potential to design the augmented human and proposes three parameters to define a design framework.

Keywords: Cyborg theory, biohackers, human-computer interaction

Critical Design in Daily Life: Lifelike Products

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Abstract: Today, a significant number of critical design projects exist only as exhibitions even though the start point of the critical design approach is to bring provocativeness into our homes. So, how can critical design be integrated in daily life alongside the developing technology? The aim of this paper is to show that lifelike products can assist in bringing critical design into our everyday lives. In the paper, the effectiveness of user interaction was emphasized for this aim. Not just any kind of interaction, but lifelike critical design projects were discussed in order to explain how lifelike traits can contribute to the practice. Also, the importance of human and pet-like characteristics in products create emotional bond between user and product was implied. As a method, examples of critical design projects were examined in the following order; without interaction, with interaction, and lifelike.

Keywords: Critical Design, Lifelike Products, Product Personality, Human Computer Interaction

Computational by Design,
towards a co-designed material culture.
A design tool.

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Abstract: Recently Digital Fabrication equipment became widely accessible, as well as the tools of Computational Design (also called generative, parametric) which are ever more powerful and easier to use. Hence, the control over a product's design can be shared between the designer, user and algorithms, even though personalisable products are still rare in the material culture. Beyond technological limitations, there might be also a shortage of adequate conceptual capabilities in the Design profession. Therefore, the paper presents a new design tool: a canvas centred on user divergences, so that the adequate degrees of freedom are left for computational co-design, benefitting from creative user contributions. The title "Computational by Design" suggests that computation in "Computational Design" shouldn't be used neither for the technology's sake, nor for marginal aesthetic and performance improvements, but it should be a new frontier of human-centred design based on a natively algorithmic thinking.

Keywords: personalisation, digital fabrication, algorithms, canvas, methodology

Materialising the Studio. A systematic review of the role of the material space of the studio in Art, Design and Architecture Education

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Abstract: In art, design and architecture education, the ideal of *learning together* is intimately bound up with the notion of the studio as a space where students learn alongside (or under the guidance of) an 'expert' tutor (Schon 1987). This is a cherished and central tenet of art, design and architecture education, and a large body of research literature has developed exploring the various dimensions of students and tutors *learning together* in the studio.

However, in an era of managerialism and the massification of higher education, the status of the art, design and architecture studio is increasingly precarious. And although the literature on studio-based pedagogy continues to grow, little directly addresses the role of material space and its contribution to learning. There is, then, a need to articulate the role of the material space of the studio in art, design and architecture education.

To address this, a systematic review of the literature was undertaken to identify the major discussions of material space in studio-based education. The process identified 38 peer-reviewed empirical studies of the art, design or architecture educational studio where at least some attention to the material space formed part of the study. A grounded theory analysis of the 38 studies identified six major themes on the role of the material space of the studio in education.

The goal of this study is to enrich our understanding of learning in art, design and architecture by examining the contribution of the material space of the studio to educational processes. In particular, by looking at the how the material space of the studio is discussed and conceptualised in the literature on art, design and architecture education. This study extends the idea of 'learning together'. Moving beyond the 'heroics' and flesh and blood of 'expert' tutors and students. It considers how the studio itself is part of the process of *learning together*.

Market as Manufactory. Making Communities

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Abstract: Manufactory (www.manufactory.works) was a live making event during London Design Festival 2017 at Old Spitalfields Market, London. Designers from Kingston School of Art turned market stalls into making spaces, transforming materials and stories from the Market into new 'produce'. Student, staff and graduate designers paired with local communities, schools and businesses, using repurposed stalls as bespoke on-site production facilities. Manufactory explored the value of short-term, place-specific design interventions for an urban market seeking to re-establish a culture of creativity and craft on its historic site. This paper considers Manufactory as (1) a learning space an exploring offsite extra-curricular learning and teaching; (2) a makerspace trialling a wide range of experimental modes of making; (3) a catalyst to reinvigorate the creative capacity of the project partner; (4) a community of practice generating insights into the ethics of participation between designers and non-designers.

Keywords: Making, Design, Participation, Market, Engagement

Deconstructing Design Research

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Abstract: This paper presents a novel conceptual framework for assessing design research projects. Present-day design research is typified by projects, which traverse disciplinary, methodological, and conceptual boundaries that often have wide-ranging social, cultural, and economic impact to industry, government bodies, and the wider public. Given design's application in addressing serious issues ranging from antimicrobial resistance to mobility, from ageing to migration it can be difficult to understand and unpick the exact nature and scale of design research and the roles that design researchers and designing (both processes and outcomes) play. The design research conceptual framework has been developed as a communicative tool for illustrating levels of design involvement in a project. The paper highlights the design input involved in current design research and provides a comparative measure of design's role in a wide range of projects that fall under the umbrella term of "design research" in the UK.

Keywords: Design research, Conceptual framework, Design ladder, Design content score

Measuring the impact of strategic design learning experience long after the classroom delivery

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Abstract: This paper seeks to examine the transformational impact of a final year strategic design module on learners some years after its completion. A subset of learners, who completed the module between two and ten years, were surveyed using a semi-structured questionnaire around Fink's (2003) taxonomy of learning. We researched how much learners still make the connections between what they have learned in the module and their current circumstances. While potentially humbling to find out how little of the detailed content is retained, particularly five to ten years after the event, we argue that the impact of the module on learners developing their creative skill-set and effectiveness in navigating team dynamics has indeed been transformative. We suggest that educators could do more to embed this longer term transformational focus by explicitly raising the future in the classroom and enabling learners to build linkages to the development of their own future selves.

Keywords: design education, strategic design, measuring learning impact, transformational learning, learning gain

Design Education. University-industry collaboration, a case study

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Abstract: Design education often happens in hypothetical contexts indifferent to reality or the surrounding context, disregarding articulation between academy and industry and with no attention to approaches that might enable the academy and the business world to get closer and share knowledge and dynamics reflecting the cultural, technological and social realities of present day society. In the expectation of having design education better address the diverse competencies that will enable graduates to deal with future professional challenges in design, a partnership was established between the University Lusíada Norte and "A Portuguesas", a start-up dedicated to versatile "easy-going" footwear and with several sustainability concerns. The present case study was integrated in a 3rd year annual unit - Design III, of the BA in Design of the Faculty of Architecture and Arts of the University Lusíada Norte.

Keywords: Design education, curriculum, higher education-industry partnerships, pedagogy, systemic design.

Code Blue. Design and the Political/Resuscitating Civics

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Abstract: How can design pedagogy intersect with civics? Understood to incorporate formal knowledge of government and the increasingly influential roles of journalism and technology, civics is distinguished from citizenship. This work reviews examples of design and citizenship literature, defines the difference between citizenship and civics, introduces the nascent roots of related contemporary political/social theory, and helps frame civics-related questions regarding the significance of journalism and the impact of large-scale technologies on information distribution. Initial resources are provided, but demand further study. The political context is American, requiring additional customization to different legal systems. To reimagine civics for design is to make difficult choices about institutional constraints on curricula. In order to best serve the designer of the future, the goal of this work is to clarify and situate the problem across disciplines so that designers can operate with full agency as astute, impactful, original, and scale-appropriate political forces.

Keywords: Citizenship, Civics, Journalism, Scale, Technology

A Reflection upon Herbert Simon's Vision of Design in *The Sciences of the Artificial*

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Abstract: This is a literature review reflecting upon Herbert Simon's vision of establishing a science of design in his book, *The Sciences of the Artificial*. The aim of this paper is to clarify the evolution of Simon's views of design in the three editions of this book and identify the value of the refinements he made in the later editions to design research. In addition to the three editions of Simon's book, the selected literature includes the major design publications explicitly criticised or supported Simon's views of design, as well as several relevant studies in the management field. It enables this paper to present a historical overview of design researchers' explorations of Simon's vision of design. Through this research, this paper demonstrates that revisiting and reimagining Simon's vision of design in his book (the third edition) may constitute a big step towards the further development of design theory and design thinking.

Keywords: Science of design, Herbert Simon, design theory, epistemology, design thinking

Redesigning Tools for Knowledge Exchange.
An Improvement Framework

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Abstract: This research explores a new collaborative improvement framework called improvement matrix, where the instructions, functions and flexibility of tools are improved within three layers of engagement. This paper describes how the framework was tested in practice through a series of workshops, where engagement practitioners redesigned tools to improve their engagement practices as part of a larger action research project. This research provided a dual outcome that enabled participants to gain a tangible benefit from improved versions of tools that came out from the process as well as enabled us to develop a deep understanding of the improvement process as the research output. The findings from three case studies suggest how the framework plays out in practice, providing guidelines on how to improve tools using the improvement matrix. We found that the matrix can be used for different purposes, such as improving flexibility of tools or designing facilitation approaches.

Keywords: Knowledge exchange, creative engagement, improvement, redesign, tools

Design skills for environmental risk communication. Design in and design of an interdisciplinary workshop

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Abstract: Effective environmental risk management and risk reduction requires an inherently interdisciplinary and cross-sector approach to communication design. The challenging global impact of this area can only be addressed by increasing skills capacity in communication design across disciplines, a challenge which itself requires the design and delivery of new expert training. This paper reports on the design of and findings from an interdisciplinary, problem-based workshop to build risk communication skills, held at the World Bank's Understanding Risk 2018 conference, Mexico City. The workshop combined high competence interdisciplinary participants (including designers) with detailed real-world scenarios in a 24-hour 'pressure cooker' working environment, designed by a team of interdisciplinary young professionals. The results show engagement from participants across the disciplines involved, who produced outcomes with a community education and user-centred focus. The workshop highlighted that more direct, critical, engagement from the design community is needed in educating about, and delivering, environmental risk communication.

Keywords: risk communication, interdisciplinary, workshop design, problem-based learning

Learning by design.

How engagement practitioners use tools to stretch the creative potential of their citizen participation practice

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Abstract: Engagement practitioners (EP) work in diverse settings for UK public service providers in the UK to increase citizen participation in decision-making for those services. They use participation tools, including pro-formas and worksheets to aid participatory activities. We identify a tension between participation tool literature advocating for design of tools to disseminate participation methods to EPs, and tool-use literature demonstrating how tools can be modified in use. We ask how are participation tools used by EPs? What roles do instruction and flexibility of use play? How can EPs develop their participation practice through tool-use; and, how can those insights inform future tool design? In answer, findings and insights are presented from interviews with fifteen UK-based EPs conducted between October 2017 and May 2018. Three recommendations are made for the design of participation tools. This research has implications for social designers working in areas including participatory design, co-design or service design contexts.

Keywords: Participation, Flexible Tool-Use, Engagement Practitioner, Creativity, Learning

Identifying Racialized Design to Cultivate a Culture of Awareness in Design

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Abstract: Racism Untaught is a research study that examines racialized designed artefacts, systems, and experiences using design research. This works is focused on cultivating learning environments for people both in industry and in academia to further explore issues of race and racism, from the obvious to the invisible. It provides the reasoning of why a it is necessary to create a framework for identifying, contextualizing, and re-imagining forms of racialized design. It is imperative design educators and organizations possess the tools necessary to foster conversations and learning environments with a focus on diversity, inclusion, and equity.

Keywords: Race, Racism, Racialized Design, Design Research, Social Impact

Games as a Catalyst for Design for Social Innovation. Unlocking legendary tools

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Abstract: Design for social innovation (DSI) is an emergent design approach that aims to identify, shape, address, and transform challenges that are appearing on the path of social change in an increasingly large-scale. In pursuit of identifying these challenges and formulating solutions in a growing problem space, this paper presents games and game design as legendary tools for DSI. In games, legendary items are stronger, more effective, rare, and more beautiful making them more desirable. The more a player progresses in a game, the more their ability to yield these items improve. Here, games are discussed in a discourse for social innovation with their strengths to inform and aid social innovation. As games can provide handles to explore both *how the world is* and *how the world could be*, the proposal originates from an analysis of games as systemic, affirmative, critical and speculative design spaces.

Keywords: Game design, Design for Social Innovation, Design research, Diffuse design

Bodygramming. Embodying the computational behaviour as a collective effort

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Abstract: During their education, the future industrial and interaction designers are increasingly faced with constructing fully or partially functional physical prototypes. As physical computing involves interaction with the physical world through sensors and actuators, combined with abstract data-memory, these pose additional difficulties for learning. While flowcharts have been useful for learning programming, we posit that using flowcharts alone are not expressive enough to efficiently help learn physical computing. In this paper we present Bodygramming, to help the design-students understand how a programs function, from the perspective of the program in a physical computing device. In essence, Bodygramming means acting out the behaviour of a program step-by-step, by following the instructions written on magnetic flowchart cards. The acting enables the experience of how the asynchronous activities are related to the behaviour of the code, in a relatable human pace. Bodygramming suggests an alternative way to understand basic programming concepts and abstractions.

Keywords: Bodygramming, Flowchart, Computational Thinking, Physical Computing, interaction design

Tools for building consensus on goals

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Abstract: This paper's aim is to discuss the impact of a set of tools specifically developed to facilitate goal alignment in multidisciplinary teams. The tools assist team members in building consensus on goals and defining priorities of complex design projects. The paper explains how the tools are operationalized within an engaging and intensive activity —a workshop context— and discusses the effects of both, the tools and the workshop, on real design situations and on the learning of future designers. The success of the workshop translates a valuable approach to the emergence of essential skills such as sensemaking, reasoning, negotiation and knowledge co-construction. The workshop activities highlight assets to generate common language and frame decision-making processes to address complex design situations. The activity flow allows for the gradual alignment of priorities and collective sensemaking leading to shared understanding of a systemic project vision. Reflecting on our observations and past implementations, this paper explicitly offers the theoretical arguments supporting our work and presents the pedagogical implementations of the tools in the context of a workshop in order to bridge from the learner's experiences to the learning outcome specific to collaborative design.

Keywords: consensus building, tool, goal alignment, collaborative design, collective sensemaking

Interdisciplinarity of Ph.D. students across the Atlantic. A Case of Interdisciplinary Research Team Building at the Student Level

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Abstract: This research explores the process of building an interdisciplinary design research team at the doctorate student level across institutions and disciplines. This study aims to establish a case addressing how to: 1) define aligned research goals, 2) outline overlapped approaches, such as methodologies, to achieve the research goals, and 3) organize a research team to conduct an interdisciplinary research project addressing overarching characteristics and research interests of members. This study was conducted in four phases: 1) understanding context, 2) framing inputs, 3) discussing processes (repeatable), and 4) analyzing outputs (products). Framed by Action Research, five data collection methods were used within the interdisciplinary team (participants) over two weeks. The interdisciplinary team building process, the benefits and shortcomings of the methods used, and the resulting research study with aligned research goals are presented in this paper.

Keywords: design research, interdisciplinary research, collaborative research, design doctorate program, inter-institutional research.

Investigating the Next Generation of Design Researchers

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Abstract: This paper explores the opportunities, challenges and needs of the next generation of design researchers (NGDRs) in the United Kingdom. As part of the first author's ongoing Arts and Humanities Research Council (AHRC) Design Leadership Fellowship, the paper reports on a series of ten NGDR workshops held across the UK, which explored the processes involved in developing, writing, and applying for an AHRC grant. The paper presents feedback from the NGDR workshop participants, who contributed to furthering our understanding of what research areas they are interested in investigating, what research-related issues they need support with, and what research opportunities they envisage for the future. Over 800 next generation design researchers attended the NGDR workshops across the UK. This paper reports on feedback from almost 200 NGDR workshop participants who articulate the highly collaborative, innovative and impactful design research they wish to undertake in the future.

Keywords: Design research, Next Generation Design Researchers (NGDRs), AHRC Design Leadership Fellowship

Applying Design Fiction in Primary Schools to Explore Environmental Challenges

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Abstract: This paper presents a case study describing the use of design fiction in a cross-curricular project with four classes across two primary schools in inner-city Sheffield. The project combined elements of a Mantle of the Expert dramatic-inquiry approach with design thinking and design fiction, to explore the world of the honey bee. We worked with the schools and children during half a term, leading them through a set of activities (including drama, design, creative writing, and 3D prototyping) to enable the children to discover and understand the threats facing bees, beekeeping, pollination, and the global environmental ramifications of a world without bees. This paper describes the approach adopted and the created design fictions. We discuss the value and limitations of our approach and conclude by offering suggestions for researchers and teachers wishing to engage young people with complex problem spaces.

Keywords: Design fiction, Speculative design, Primary education, Mantle of the expert, Environment

Running with scissors in Business Management Education. A collaborative autoethnography on designing pedagogical interventions with an art-maker and an academic skills tutor

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Abstract: Our research aim in this interdisciplinary collaborative writing project is to provide encounters with process, affect and relationality. Through this paper we share how we have gone about stepping outside our comfort zones, to design workshop activities to help business management (BM) students prepare for an alternative kind of assessment. Utilising collaborative writing techniques and ongoing email, Skype and in-person conversation, we show the power of reflexivity and serious play to bring a polyvocal response to running with scissors, allowing vulnerability and unknowing to challenge our positions and show how we have learnt alongside the students we teach.

Keywords: Management learning, designing interventions, essay planning, novelty, assessment

The Role of Empathic Design Research in the Prototyping of Interactive Visualizations

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Abstract: In this paper, we argue that there is an opportunity to develop a new process for the creation of interactive data visualizations by applying and extending the methods of empathic design. In particular, we consider the criteria summarized by Thomas and McDonagh (2013): "empathic research strategies incorporate shared language, collaboration, ethnography, and empathy." We anchor the discussion in a pilot project involving a new navigation system for visually impaired people, where an empathic exercise designed by the visually-impaired participant formed the basis for increasing the empathic understanding of the designer.

Keywords: Empathic design, interactive visualizations, inclusive design

Co-design in mental health; Mellow: a self-help holistic crisis planning mobile application by youth, for youth

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Abstract: This paper reports on a community-based project to collaboratively research, design and test an integrated digital crisis planning tool for youth ages 13 to 24. Research goals included understanding: what crisis means to the target group and what strategies they employ for coping with crisis; the ways youth in crisis are most likely to communicate; how new technologies can help deliver the services youth need. The project was established with several guiding principles: that students should act as the front line researchers and designers with the guidance of faculty and community partners; that we should aim to move beyond consultation to truly participatory design methods involving end-users in needs identification, idea generation, design development and testing; and that by having the students interface with the end-users, we would alter the power balance by building trust and avoiding a top-down approach.

Keywords: co-design, design education, mobile application, mental health

Natural materials. A family on the move, but where is the last stop?

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Abstract: Understanding, using, imitating and exploiting nature are diffuse methods aimed at producing innovative materials and solutions able to interact with user and environment in an innovative and sustainable manner. The paper will propose some discussions on the current situation and on the future scenarios for the "natural materials" class. New natural materials (around 40 materials coming from different living kingdoms) have been studied through a multicriteria analysis, which considers the environmental impact of materials, in a qualitative way, and their artificial thickness. How much these new materials can be considered natural and whether or not their artificial thickness is still compatible with the definition of natural will be two leading questions in the contribution. The work will open a discussion on the difference between a "natural material" and a "sustainable material", with attention to the aspects of renewability of resources, end of life scenarios, productive chain length and artificial thickness.

Keywords: natural materials, artificiality thickness, living organisms, material libraries, design for sustainability.

A Respectful Design Framework.
Incorporating indigenous knowledge in the design process

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Abstract: To stay within the planetary boundaries, we have to take responsibility, and this includes designers. This requires new perspectives on design. In this work, we focus on a co-design project with indigenous communities. Within such communities, indigenous knowledge is central. Indigenous knowledge acknowledges that the world is alive and that we, as humans, are merely a small part. Central in our approach is Sheehan's respectful design, which ensures a central place for indigenous knowledge in the design process. However, Sheehan's approach does not state in pragmatic terms how such a design approach can be achieved. Some of the co-design processes we engaged in led to respectful design spaces, others did not. This helped us to identify patterns of dynamics that are essential for respectful design. At the core of our findings lies the observation that in order to reach a respectful design space, in which indigenous knowledge is embedded, a shared dialogical space between community and designer is essential.

Keywords: Co-Design, Indigenous Knowledge, Communities, Design Approach, Ownership

Implications of the Bioinclusive Ethic on Collaborative and Participatory Design.

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Abstract: To address the current unsustainability of socio-technical-ecological systems, humanity and design should increasingly consider the needs of natural entities. This paper outlines initial considerations for nature-inclusive Collaborative and Participatory Design (C&PD) by critically questioning the approach through the perspective of a bioinclusive ethic, one of the nature-inclusive ethical frameworks. It suggests that bioinclusive C&PD and its sub-approaches would explicitly acknowledge nonhumans as non-designers and would, to a varying extent, involve them in the design processes. They would explicitly outline the benefits of involvement of human and nonhuman non-designers and grant goal-setting and decision-making power to the latter. Bioinclusive participatory design would explicitly acknowledge humans and nonhumans in its core principles and directly or indirectly involve the nonhumans. Bioinclusive collaborative design before use would ensure that nonhumans can impact the goals of the project. Finally, bioinclusive collaborative design-in-use might embrace nonhuman-made adjustments to designs during the use time.

Keywords: Bioinclusive Design, Nature-Inclusive Design, Collaborative Design, Participatory Design, Bioinclusive Ethic

Gaming for Active Nature Engagement.

Animal Diplomacy Bureau: designing games to engage and create player agency in urban nature.

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Abstract: As humans migrate into cities, nature-based interactions diminish. City based nature encounters increasingly occur in human managed wildlife areas, e.g. city parks, offering polarised perceptions of biodiversity. The 'extinction of experience', arises when people reduce active engagement in nature, resulting in a lack of comprehension or impacts towards local wildlife. Ensuing in demands to reconnect people to nature. The Animal Diplomacy Bureau (ADB), feature designed game experiments providing agency to participants. Experts believe increasing people's '*nature engagements*' can lead to regenerative cultures, potentially affecting participants' mind-sets. Games empower players to attain knowledge about local wildlife in city parks, creating a discussion platform for a 'more-than human city'. Expert peers informed gaming methods, design led research and public engagements. ADB's framework, transformed research tools into instruments of agency giving players the knowledge to understand and reimagine of a more wildlife friendly resilient city/society through gameplay.

Keywords: Designing for resilience, Engaging Nature, Sustainability, Gaming, Public Engagement

Atlantic Wonder. Exploring Nature and Design in Madeira island

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Abstract: This paper describes and reflects upon the experience of the first international summer school "Atlantic Wonder" (SSAW18) happened in Madeira last July 2018. This event was the first experiment of a wider research that pretends to understand how Design can contribute to the preservation of natural resources and ecosystems. This summer school was designed with a complex programme using a series of different tools and approaches (i) to tackle the lack of a conversation and culture on a local level recognising Nature as one of the main resources; (ii) to put in dialogue an international design group of participants with local experts working in the fields of biology, botany, geology, agronomy and sustainable development; (iii) to experiment a new design driven, Nature-led approach. The SSAW18 allowed cross-fertilization and interdisciplinary responses that in the end of the experiment resulted to be collaborative, novel and inspiring.

Keywords: Nature Centred Design; Walking as learning; Design process; Nature; Learning from Ecosystems.

Nature-Centered Design. How design can support science to explore ways to restore coral reefs

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Abstract: Coral reefs around the world are experiencing a continuous process of degradation which is a result of both human activity and natural causes. Using digital design tools and design thinking methods, designers can help the global effort to find new ways to better understand the next practices of protection and restoration of coral reefs that experience devastating annihilation. This example reveals a new challenge - Nature-Centered Design - which is the next practice needed for the coming colossal challenges in our Anthropocene era. In the current research the efforts were focused on finding new ways to create artificial corals made of bio-plastic, using different materials, colors, sizes and forms stemming from the same scanned model. The different 3D coral designs were tested for fish behavior around them. The early results of the research show that 3D printed corals can be installed and become a habitable place for fish. This finding helps to support a recovery of a reef since fish, as inherent part of the reef, can protect and enrich a new planting of corals. This case highlights the potential of tackling environmental challenges through design.

Keywords: Nature-Centred Design, Coral 3D-printing, Design Thinking, Marine Biology.

Using the SDGs to Nurture Connectivity and Promote Change

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Abstract: The sustainable development goals (SDGs) were introduced by the United Nations in 2016 to replace the millennium development goals. This paper examines the impact of integrating these goals within a design challenge, as part of a level 3 undergraduate degree module. Design Values, Issues and Ethics is an expansive module, aiming to broaden the students' discipline focus and allow them to expand their learning within a new landscape. This module promoted the utilization of nature-based intelligences to establish solutions to a community's basic need to survive and thrive. The SDGs were integrated through embedding them as part of a future-building scenario, supported by a series of exercises and seminars. Students were then asked to reflect on how the SDGs had impacted their design process, and to consider ethical and value dimensions.

Keywords: future-building scenario; indigenous knowledge; Reason Design Process; systems theory; value-based design

Implementing bio-design tools to develop mycelium-based products

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Abstract:
The proposed research offers an integrated methodology fusing material-driven design process with biotechnological tools, to explore the potential of mycelium-based composites as sustainable alternatives in design and architecture applications. The ecological role of saprophytic fungi as organic matter decomposers in is recently harnessed to construct highly porous materials made with regional pruning waste bound by fungal mycelium. This study aims to establish a primary framework to imply mycelium composites in circular production scenarios. According to literature, the physio-mechanical performances of mycelium are affected by parameters such as substrate content, incubation conditions and fabrication process. Our study explores how substrate composition affect mycelium development and derivative material performance. The relations between visual, chemical, and physical properties of mycelium composites were inspected. Results indicate clear variance in material properties of assorted compositions tested. By altering these variables, mycelium-based composites can be inherently modified to suit diverse implications.

Keywords: mycelium materials, bio-fabrication, bio-design, bio-composites

Designing Transitions Bottom-up.
The agency of design in formation and proliferation of niche practices

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Abstract: Sustainability transitions are generating comprehensive learning spaces, which yield substantial reconfigurations not only in our practices and actions, socio-technical systems, but also in our cognitive constructs. This article tackles the agency of design in transitions, by particularly focusing on bottom-up and emergent learning processes at niches. An overview on common lines of inquiry from (1) design theory, (2) multi-level perspective (MLP) of system innovations and (3) practice theory (PT), which commonly address the agencies of design and learning in transitions, is presented. Consequently, we propose an integrative analytic-theoretical framework, and describe it with an exemplary analysis of a community-led transition project.

Keywords: sustainability transitions, design theory, practice theory, multi-level perspective, learning space.

Co-designing Mobile Collection Points with Older Persons to Promote Green Attitudes and Practices in Hong Kong

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Abstract:
Hong Kong has actively promoted various recycling campaigns over the last decade, but much improvement is still needed, as only a small portion of the region's waste is collected for recycling in towns. By exploring the latent needs and concerns of the public through involving older people and recyclers, the recycling process can be streamlined and made more effective. This paper reports on a participative workshop in which older people, representatives of local recyclers and designers discussed future directions for the design of mobile collection points. This process was facilitated by quick models and developed through an iterative process. In this consultative exercise, the participants indicated that the public lacks motivation for recycling, despite the launch of some educational campaigns. Therefore, a series of promotional campaigns on waste sorting and clean recycling should be focused on specific groups of people to maximise the campaigns' effectiveness. Also, the failure to fulfil the principles of universal design may cause difficulties or discomfort in using recycling facilities, which can hinder public willingness to use mobile collection points.

Keywords: Co-design, elderly, green attitude, universal design, sustainability

The role of design in discovering speculative futures materials for local revaluation.
Investigation of the methodology

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Abstract: This paper will analyse the role of design in the development future of strategies to re-evaluate non-urban areas through the assessment of indigenous materials and the individuation of speculative, valuable, future strategies. Assemble Studio (UK), Rural Studio (US), Banca del Fare (IT) in collaboration with Calchera San Giorgio (IT) and Breaking the Mould (IT) are examples of design studios and projects that are working with local resources from specific forgotten places, obtaining surprising outcomes that are empowering previously ignored realities. Rediscovery, recycling, reusing and remaking are key words common to all these case studies. As a result, an original experimental methodology for new doctoral research on speculative futures materials for local revaluation is emerging, based on the observation and analysis of the design approaches within the different design studios.

Keywords: Territory, indigenous materials, local community, design research method, unconventional future scenarios

Climate Anticipation. Working towards a design proposal for urban resilience and care

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Abstract: The 'winter of…' and the 'hottest day since…' are narratives that describe our experience with a climate that informed our behaviours of the time. What was, isn't necessarily what will be, and as global climate change shifts and pushes us into unfamiliar climatic experiences, we seek a more meaningful way to anticipate climate change. In this instance climate is viewed as a disruptive element in society with its shift, apparent unpredictability, and impact affecting those less equipped to anticipate. With extreme changes in temperature, high air pollution levels, and lack of rain water, climate change is felt and seen. CAPE (Climate Anticipation Personal Environment) is a conceptual framework to inform society of impending environmental extremes by communicating immediate futures. Four case studies explore current technologies being applied in our surrounding terrestrial and extraterrestrial environments. Together they represent our anticipated materialisation of CAPE. This paper seeks to enable vulnerable communities to be better prepared through warning systems, to better seek relief through interventions, and to develop anticipation and care in large cities, those lacking green spaces and natural approaches in order to align climate anticipation with the needs of society. [STYLE: _RwS Abstract]

Keywords: Climate Change, Anticipation, Sensing, City, Communication

The Role of Philosopher Designer in Defining New Attitude towards Nature

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Abstract: The world of design is the world of artifacts. The world of man-made objects and based on human needs and wishes, which at first glance, stands opposite to the "facts" and whatever is "natural" with the common definition as part of the universe that human beings don't play any role for its formation. This confrontation brings a great responsibility for designers. Since the constant and rapid development of the artifacts, which designers have very important roles in their creation, and sometimes are in contrast with what are natural, causes serious problems for humans and other creatures due to the disturbance in world balance and integrity. This article tries to address some ancient oriental philosophies in redefining the relationship with nature and the meaning of the world for designers. It also emphasizes the importance of educating "philosopher designer", in order to change today's dominant approaches in the process of design and making artifacts.

Keywords: Ancient eastern philosophy, Philosopher designer, Ontology, Poeisis

The unintended consequences of embedded values in socio-technical systems. A critical reflection using formal analysis of speedometers in customer vehicles.

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Abstract: In order to produce different or innovative solutions, design always implies a systemic view of problems, and a search for alternative solutions. The need for a transformation of our socio-technical systems have led us to believe that we can use a more sustainable path by observing nature, but there is an ethical discussion that is required. This paper looks at the notion of embedded values as a natural and unavoidable part of the design process and questions if the optimistic view of a Nature-Inspired design might lead us to forget that those human values are still being used in place and overlooked with the notion that we are following nature's values.

Keywords: Embedded values, Complex Social Systems, Design ethics, Design research

Ecocene Design Economies. Three Ecologies of Systems Transitions

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Abstract: Despite accumulative social and technological innovation, the design industry continues to face significant obstacles when addressing issues of sustainability. Climate change and other systemic ecological problems demands shifts on an order of magnitude well beyond the trajectory of business-as-usual. I will argue that these complex problems require addressing the epistemological error in knowledge systems reproducing unsustainable designed worlds. Ecological literacy is a basis for nature-inspired design. Ecologically engaged knowledge must inform design strategies across the psychological, the social and the environmental domains. With the expansive three ecologies perspective, interventions at the intersection of design and economics can enable systems transitions. This theoretical work informs a framing of the current epoch in ways that create a foundation for the creation of regenerative, distributed and redirected design economies.

Keywords: nature, regenerative, systems, entanglement, transition

Happy Affect. Harnessing Chance and Uncertainty in Design Practice

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Abstract: This paper engages with recent discourses on affect and design research, arguing that such dialogue offers a particularly useful set of ideas to extend our understanding of design research as a creative and active force for rethinking ideas about design across disciplines. Calling upon the theory of affect as explored by Sara Ahmed, the authors analyse two object-making case studies–one from an American graphic design practice, and another from a French architectural practice. Recognizing the uncertain nature of creative practices, the paper offers an understanding of 'sticky' and happy affects embodied in the making of, and use of everyday objects, such as mailboxes and recycled pallets, which keep bodies in the present because of a non-cathartic, less forceful affectual condition. Indeed 'sticky' happy affects propose alternative ways of comprehending the multiple forces involved in creative practices invested in design research. Such exploration illuminates not only the work of the designer, but also the engagement as users, where the work is never complete.

Keywords: affect; object; design process; happy

Steering Gently. Crowd management with a non-confrontational philosophy

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Abstract: Public spaces of cities may be characterized as noble constituents of the great project of the *beau idéal* society. They uniquely contain corporeal selves personally engaging with the urban environment or partaking in collective celebration. Potential for celebrations going awry calls for preemption and management. Some interventions spiral into conflict. It has been suggested that strife often erupts as a result of the intervention applied; the latter, in turn, is manifestation of a foreordained philosophy. Perception of congregation as a group with a foremost goal of celebration might beget an alternative outcome from perception of crowd solely as a latent aggressor. We explore crowd management with a tactical combination of philosophy of community policing, mutual/social influence and choice, altogether set within a frame of emergence, using an agent-based model. We are able to illustrate that strategic manipulation of the structure of the crowd, using the described tactical combination, is feasible.

Keywords: Public space, Moral holiday, Social influence, Choice, Crowd management

Renewing technology-driven materials research through an experimental co-design approach

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Abstract: The design thinking approach and co-design methods have gained popularity in recent years. Also, design thinking is increasingly often applied to solve complex problems in different domains. This case study focuses on the issue of how to renew technology-driven materials research through an experimental co-design approach. The project under study is a material development project that ran for three and a half years. This project focused on emerging material technologies and therefore used a design-driven approach to further boost the material innovation aspect and to challenge the technological side of the project. Deductive analysis has been used to build an understanding of the constructivist learning that occurred in this case. The findings show that the experimental process influenced the materials research and that learnings occurred through knowledge, skills, attitudes and values. A new layer has been added through 'soft' knowledge into technology-driven materials research. Pivotal learnings occurred between disciplines and even serendipitous elements have been identified.

Keywords: Co-design, Design-driven, Interdisciplinary, Innovation, Constructivist learning

Applying Storytelling Method into the Flow of User Experience Design to Innovate with Serendipity. A case study on AIDS detection service design among college students

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Abstract: Story-telling, as one user experience design method, is the carrier of information transmission that helps to induce an emotional resonance with the audience and enhances the sense of substitution. In this study, the story-telling method has been employed in analysis from three perspectives. Firstly, we applied this method to user experience design and explored the association between this method and serendipity. Secondly, a story-telling model based on user experience design was proposed, and was validated by the case of 'college student AIDS self-detection service design.' Thirdly, the model was further improved on the basis of experimental results, and the three factors of generating serendipity from the story-telling method, including logical framework, trust relationship establishment, and cooperation mode. The investigation into the story-telling method and serendipity would offer researchers a new clue to excavate user demands and diverge the design concepts during user experience design.

Keywords: Storytelling Method, Design Strategy Experience Design, Serendipity

Designing for emergent interactions.
Strategies for encouraging emergent user behaviour & serendipitous research findings

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Abstract: In this paper, we discuss emergent interactions as a design strategy in the context of cultural museum exhibitions, and how we can use these strategies to be more open to serendipitous findings in design research. We propose that emergent narratives can be transferred to the design of interactive exhibitions, and thereby removing the constraints and open use situations for more personalized, and potentially structure-breaking user experiences. Whereas much research in accidental discoveries in design focus on discovery in the design process, we propose the same accidental discoveries might be transferred as design strategies aimed at the end-users themselves making emergent interactions that can inspire serendipitous discoveries in research and design. As such, we ask the research question if we can leverage serendipitous findings from the design process to create the potential for emergent interactions for the user?

Keywords: emergent interactions, emergent narratives, design strategies, research through design, cultural exhibitions

Serendipity? The Inspiration of Medieval Masons in Cathedral Floor-plan Design

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Abstract: Cathedrals as very large religious buildings spread worldwide, but in medieval times were peculiar to Europe. It seems that the design of cathedrals often had various symbolic implications. Usually, cathedral floor plans are considered as the first step in the whole construction process, and are related to other parts of the cathedral's construction. Previous literature suggested that complicated geometrical and numerical proportions were found in the measurements. The masons, including the master masons, were not likely to have had a sophisticated understanding of mathematical and geometrical systems. This paper suggests some simple geometric methods which may be used in the design of the whole cathedral floor plan, based on the square and its derivative constructions, including golden-section rectangles, $\sqrt{2}$ and other root rectangles and sacred cut squares. It is argued that simple methods were adopted by the masons in the planning and design process associated with cathedrals in medieval times.

Keywords: Cathedral, Proportion, Floor plans, Medieval masons

Surrendering to The Now. Improvisation and an embodied approach to serendipity

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Abstract: In this paper I want to call attention to an embodied perspective and the ability to practice serendipity. I draw on Classical Pragmatist philosophy to offer insights for understanding serendipity in immediate experience and its significance for inquiry. In particular, John Dewey's view of aesthetic experience offers a starting point for developing an articulation of the embodied relation to inquiry from an artistic approach. Dewey proposed that being deeply engaged in inquiry requires not only acting in controlled ways upon the world but also undergoing or surrendering to experience. I use his view of surrender to characterize a receptive yet active state of awareness open to stimuli and the imaginative sensing of possibilities, new perceptions, and new meanings. To illustrate the subject, I draw on my training with movement improvisation and the approach of Surrendering to The Now.

Keywords: Embodied methods, improvisation, serendipity, Pragmatist philosophy

Serendipity as a Catalyst. Knowledge Generation in Interdisciplinary Research

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Abstract: Our paper discusses the design-led processes in a project starting as multidisciplinary, focusing on three serendipitous cases that influenced the outcomes and the textile-design-research path taken in the overall project. The work presented here revolved around semiconductive cotton, suitable for textile design, and examines it from the design team perspective. This paper identifies and discusses three cases, as they had considerable weight on the project path. In order to understand these cases, we evaluated them based on a model for a serendipitous experience. The follow-ups to the serendipitous connections gave empowerment to the design research team, increasing their ownership of the research results. Relaxing boundaries between disciplines and varying routines have been highly relevant factors in the new knowledge generation. Ability to perform a consented and significant diversion to the research path was crucial for reacting to the serendipitous discovery and establishing the research space of the interdisciplinary project.

Keywords: Serendipity

Kinetic morphologies. Revealing opportunity from mistake

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Abstract: The active role materials play in the emergence of outcomes from making is considered in this paper in relation to the opportunities provided by adopting working methods that acknowledge and favour such an active role in practice-based design research. Allowing another "voice" to come into play in the making process widens the possibilities for unforeseen, generative outcomes to be revealed. Intuitive working modalities that explore material tendencies and capacities and support their manifestation, combined with structured processes of exploration and supported by documentation, reflection and analysis methods, offer opportunities to devise productive hybrid methodologies for practice-based research in textile design. This paper describes an accidental event arising from hands-on engagement with a material, leading to an unforeseen result. It further considers how, by broadening my understanding of the material's potential and foregrounding its active role in the making process, the event motivated a shift in the focus of the research and the consequent redefinition of its objectives while influencing the methods subsequently used in the exploration.

Keywords: practice-based design research, making, morphogenesis, kinetic morphologies, textiles

"Ah, I see what you didn't mean"
Exploring Computer Aided Design tools for design ideation

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Abstract:
It is often claimed that Computer Aided Design (CAD) tools are unsuitable for design ideation as they are said to not support serendipitous interpretation, playfulness and creativity. However, this notion is based on anecdotal evidence and research that was done using CAD tools now considered obsolete. This study therefore aims to provide insights on the use of currently available CAD tools for design ideation. This was done by having three experts evaluate the use of pen-and-paper sketches and four different CAD tools for design ideation and discuss the results. The results from this study suggest that CAD tools have the potential to support serendipity and provide an environment for creativity and playfulness. There are several opportunities for the use of CAD tools in design ideation. This is certainly true in design fields where it is notoriously hard to make sketches, such as in lighting design.

Keywords: Creativity, ambiguity, serendipity, happy accidents, re-interpretation

Serendipity in the Field. Facilitating serendipity in design-driven field studies on ship bridges

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Abstract: Field research requires openness to unforeseen insights and opportunities, especially when designing for complex and dynamic workplaces, such as a ship bridge. In this paper, we investigate how serendipitous outcomes may be facilitated in design-driven field research. We present a case study of two field research trips onboard Arctic-going vessels, during which we investigated the premises of designing augmented reality (AR) systems for navigators. We describe how an explorative and opportunistic mixed-methods approach facilitated serendipity and analyse which specific aspects led to serendipitous outcomes in three examples. Last, we discuss how practical support for designers and design researchers conducting design-driven field research can be developed and suggest how strategies to employ approaches that facilitate serendipity can increase the likelihood and awareness of serendipitous outcomes.

Keywords: Design-driven field research, Ship bridges, Serendipity, Maritime design, Augmented reality

Designing Branded Atmospheres. Nature-inspired, multisensory spatial brand experiences for consumer electronics retail stores

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Abstract: In today's saturated market, meaningful emotional appeal becomes the key differentiative factor for physical retailers. The path to human emotion is through the senses, but spatial design still faces a limited understanding of sensory compatibility. Nature, however, benefits human wellbeing especially because of its sensory fluency. This research, therefore, tried to address: How can nature-inspired design improve multisensory brand experiences for more meaningful emotional connections with customers? A combination of qualitative and quantitative research approach was applied in order to identify the patterns in people's perceptions and experiences of nature and of the brands. The findings showed that the brand personality concept can mediate the meaning and emotion from nature to brand experience, based on a surprisingly high agreement during the experiment of associating nature to brand personalities. This unexpected finding enabled identifying brand personalities' sensory patterns, and re-imagining the retail atmosphere design process with the nature-inspired experience theme.

Keywords: Multisensory design, Biophilic design, User experiences, Spatial design, Design strategy

Design Thinking for Innovation. Stress Testing Human Factors in Ideation Sessions

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Abstract: This paper reports on a series of studies that attempt to unpick the factors that contribute to successful team ideation. Ideation is a popular, structured approach to creative thinking, where the goal is to produce many viable and innovative ideas and concepts. This is often accomplished through structured collaborative workshops that include 'Design Thinking' techniques and methods. The reported studies involved manipulating variables in controlled experiments with subjects (AKA ideators). The sample of ideators, were tasked with generating ideas to solve a challenge and the outcome of their work was measured by quantity and quality of output. The latter criterion was assessed by an expert panel using a standardised evaluation framework. Four variables were employed to understand idea generation success factors. These were identified as common and thus easily applied factors in typical ideation scenarios and included varying levels of participant stimulation (before sessions), presence or absence of a facilitator, application of 'Design Thinking' technique (or not) and lastly, participant profile based on professional background. In this case, participant characteristics were split between designers and non-designers. The different experiments were run, with participants generating ideas in a timeboxed activity in which their outputs were assessed against the various experimental conditions. The findings suggest that counter orthodox thinking, applying the methods (e.g. Round Robin) is less effective than the influence of ideators' differing professional background and their level of stimulation. These conclusions in turn suggest the possibility of extending the effectiveness of workshop facilitation to increase efficiency and quality of output. The paper concludes with pointers on improving ideation. In particular, increasing levels of engagement and immersion among participants and using aspects of game theory are seen as possible areas of further investigation.

Keywords: Design Thinking, Ideation, Collaborative Work

Attempts, Failures, Trials and Errors. Notes on an exhibition of failed prototypes and rejected projects.

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Abstract: In this paper, we present the history, the concept and the results of "Attempts, Failures, Trials and Errors" exhibition project which was first presented in the frame of Piksel Festival in Bergen, Norway (November 2017) and later on at "Salonul de Proiecte", Bucharest, Romania (February 2018). The project aimed to incite the e-textiles artists and designers to reflect upon the way they are engaging with their failures, as well as to the way in which they use these failures to better understand the context in which they are working and to continue to experiment. Our approach reverses the common R&D constructivist methods, by using deconstruction as a process of investigation in the field of wearable technologies and e-textiles. By questioning the ideas and the concepts of failure and success, the project puts an emphasis on art's capacity to be critical, while at the same time to poetically and self-ironically address contemporary challenges and concerns.

Keywords: E-textiles, attempts, failures, trials and errors, prototyping, publishing, technical development, institutional constraints.

A New Method To Evaluate Good Design For Brand Recognition In The Digital World

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Abstract: Visual aesthetics has become a crucial element in strengthening brand experience. In the digital era, however, designers need to approach aesthetics from a holistic standpoint where both traditional and more modern factors are taken into consideration. In this paper we present digital BrandUX, a new method to improve brand consistency through the evaluation of aesthetic features. It builds on the Design Format Analysis (DFA) of Warell (2001) with the addition of a structured step-by-step approach. To test the method we analysed two web sites using both DFA and digital BrandUX. The results showed that digital BrandUX is a promising advance in aesthetic evaluation, assisting designers in identifying a greater number of visual aesthetic features. Moreover, the method ensured that the designers explored and identified all types of factors, with the exception of language. Future lines include the development of a handbook to improve ease of use of the method.

Keywords: aesthetic evaluation, brand experience, website, consistency

Industrial Design Education in the Age of Digital Products

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Abstract: Preparing product design students for the design of digital products provides a challenge for product design educators. This paper reports an experiment in a senior-year product design studio course. Students were assigned three projects with three different strategies based on the management and the structure of the design process. The analysis of observations on students' design processes, semi-structured interviews with students, and the analysis of design solutions revealed that students mentally separate a product's physical form and digital interface. Students reported time management as their biggest challenge for the design of digital products. Even though they experienced problems in their design process, they think interface design skills as a part of their professional requirements. These findings indicate a need to better address the design of digital products in product design curriculum in general and studio education in particular.

Keywords: Digital products, User interface, Scholarship of teaching and learning, Product design, Studio education

Improving Design Software Based On Fuzzy Kano Model: A Case Study of Virtual Reality Interior Design Software

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Abstract: Under the background of digital information age, fast responsive iterations on products innovation and services innovation are one of the core competitiveness of enterprises.Computer based systems in the digital age can collect widely feedbacks and therefore enable fast iterative evolutions.The ability to improve the quality of products and services can make users more satisfied,but at the same time it will lead to a significant increase in corporate costs. Therefore, subject to the rapidly changing market demand and the limitations of the company's own resources and capabilities, how to scientifically acquire demand and conduct importance research on demand factors is crucial for iterative innovation. We presented a requirements analysis method based on Fuzzy Kano Model.This method allows a software company quickly gather user's requirements to improve the quality of their software.

Keywords: Fuzzy Kano model, Rough set theory, Fast iteration, Requirements analysis, Virtual reality

Social Design Fiction. New Methods for the Design of Emerging Technology.

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Abstract: There is no shortage of Emerging Technologies all vying for our attention; a recent example of this is 3D Printing. However, a great deal of this technology fails to deliver on its potential. The implications of these technologies on our everyday lives are often very difficult to envision and even more difficult to predict, so the difficult questions surrounding social adoption and the domestication of these technologies are often absent from the discussion. We describe new design methodologies that seek to resolve this issue and discuss existing studies in the 'real world', to highlight the key challenges and opportunities for this method. We then describe the findings of two workshops, to discover how the public envisage they will engage with 3D Printing technology in the future. Ultimately, this paper highlights how Design Fiction can contribute to resolving key social challenges associated with the widespread adoption and exploitation of emerging technology.

Keywords: Design Fiction, Speculative Critical Design, 3D Printing, Social Design

The Transformative Effects of Digital Technologies on the Product Design Practices of Servitizing Manufacturers

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Abstract: Digital technologies have enabled manufacturing companies to extend their product-based portfolios with innovative service offerings. Various aspects of this shift have been explored from a service and system design perspective. However, the transformative effects of the deployment of digital technologies on product design practices, particularly in manufacturing firms have been relatively neglected. To explore this issue, semi-structured interviews were conducted with 22 manufacturing industry experts. Four product design practices that underwent a change process as a result of digital transformation were identified: Modifying product designs to enable diverse servicing options at the outset, redefining the role of customer data in the design process, focusing on the outcomes to facilitate co-creation, and designing feedback mechanisms about the past and current product status. The articulation of these themes contribute to the design literature on the effects of digital transformation, as well as to the literature on service transitions in manufacturing firms.

Keywords: Digital technologies, Manufacturing industry, Product design, Servitization

Document-while-doing: Documentation tool for Fab Lab environments

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Abstract: Maker and DIY communities are constantly sharing tutorials, projects documentation, as well as design sketches and model files. Producing documentation of good quality has its challenges, one of them being the amount of time needed to generate it. In this paper, we present a software tool that assists makers and hobbyists in creating reports and tutorials of their projects on-the-go, that is, at the same time they are working on them. A mobile phone application allows taking pictures, grouping them and annotating them with text and audio. All the material collected during the making activity is automatically stored online and presented in a website created for the project. The maker can later modify this site by means of adding additional text, reordering the pictures, or including extra multimedia content or design files. This tool is specially tailored to the documentation needs of the Fab Lab network.

Keywords: documentation, DIY, Fab Lab, Fab Academy, digital fabrication, maker culture, documentation, tools, document-while-doing

Synthesizing Opposites: Technical Rationality and Pragmatism in Design

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Abstract: HCI and design research literature commonly assert a distinction and even opposition between Rationalist and Pragmatist epistemologies (e.g. Schön 1983/87, Winograd & Flores 1986, Suchman 1987). In this literature, design processes are often characterized using a pragmatist perspective. Design theorists, often relying on Dewey (1933) typically focus on the design process, including the "why" and the "how" of design (e.g., Schön 1983, Cross 2011, Nelson & Stolterman 2012, etc.). However, many design practitioners appear to follow a Technical Rationality perspective while actually designing: they are bound to deliver outcomes in limited time, and they seek to optimize their limited resources and techniques. Despite this seemingly opposite nature of Rationalism and Pragmatism, many design practitioners and researchers have converted from one to another paradigm during their careers– e.g., Bruce Archer (1979), Christopher Alexander (1977), John Chris Jones (1992). However, to our knowledge, there is little to no literature on how designers synthesize both paradigms within a single project, reinforcing the apparent divide between them. In this work, we critically engage with a design research process, entitled Designing Tools for Reflection, to show that the integration between these two epistemic stances can be coherent and support design. Drawing on our analysis of the design project case study, we identify and discuss about two different and possible manners of this integration, side-by-side and serial epistemic integrations.

Keywords: Design process, Design theory, Paradigms, Design research.

Fruitful Gaps in Digital Literacy: Interpreting gaps in digital literacy among stakeholders in collaborative design research projects as an evolving innovative capacity

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Abstract: This paper discusses the problem of assessing shared value from collaborative design research projects through the lens of evolving digital literacy. Through mapping a seven-year co-design case study, based on multiple collaborative design research interventions in the same organisational practice at the Danish aqua zoo 'The North Sea Oceanarium'. The development of contextual literacy is identified as an important dimension when discussing co-design, but also an issue in which the stakeholders rarely will reach equal literacy. However, we argue this gap is not a fault of co-design, but rather an indicator of a gradual mutual increase in innovative capacity among project stakeholders. We argue that the gaps in digital literacy, which may initially be seen as an inhibitor, might evolve to one of the strongest value propositions of collaborative design research projects within the broader area of interest; design of digital media systems.

Keywords: Collaborative Design Research, Co-design, Digital Literacy, Organisation, Exhibition

Questioning the social and ethical implications of autonomous vehicle technologies on professional drivers

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Abstract: The haulage industry and its drivers have been using vehicles with the first generation of advanced driver assistance systems (ADAS) for the last three years, gaining a wealth of knowledge and experience in the millions of kilometres driven. Despite this, there has been little research to understand how these technologies have been received by HGV drivers. To date, designers have typically focused on the control protocols that will govern decision-making and the potential gains in efficiency and social mobility that such technologies may unlock (Milakis, van Arem & van Wee, 2017). By contrast, this paper will present findings from a qualitative study conducted with HGV drivers to examine their overlooked role as the pioneers of driverless technologies. This paper will explore the value of the experiences of HGV drivers and the real-world opportunities and challenges that may be presented through the proposed introduction of autonomous vehicles.

Keywords: Driverless, Autonomous, Trucks, Ethical, Social

Strategies for Empowering Collective Design

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Abstract: Collective activities such as crowdfunding, competitions, jams and hackathons are gaining more attention in innovation management. However, within the design domain such activities are often considered as a way for mass generation of ideas, rather than processes for developing proper design solutions. Information acquisition, gaining sufficient knowledge and generating feasible ideas are among the main challenges of collective design. In this study we applied three strategies of rapid design, informed participation, and knowledge sharing to overcome these challenges. During a one-week design hackathon, we conducted a collective design project in which three teams of participants conducted autoethnography research, shared their findings by an idea crowdsourcing platform, and tested their 3D printed prototypes with potential users. Although the tests showed efficiency of rapid design and informed participation strategy, we did not find knowledge sharing effective, mainly due to the absence of collaboration among teams.

Keywords: Collective Design, Rapid Design, Informed Participation, Knowledge Sharing

Service orientation–based tool for assessing and improving service design and development practices in manufacturing industry

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Abstract: Industrial manufacturing companies are increasingly shifting their focus from products to services, challenging their development functions at the operational and strategic levels. When strengthening a company's service orientation, attention must be paid to service experience and value co-creation, which create momentum for service design. However, the research has thus far been silent on concrete guidelines for how to proceed with servitisation. In this article, we propose a service orientation–based tool to facilitate service development and design in industrial manufacturing companies. The tool combines previous research on NSD and service design with empirical investigations and the authors' experience. The tool provides a framework for assessing and improving the organisation and implementation of service design and development in industrial manufacturing companies.

Keywords: Service design, NSD, industrial services, maturity model

Inclusive Design for Immersive Spaces

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Abstract: It is vital when creating learning environments that attention is paid towards individuals using a given space, activities that they will carry out, and the available equipment that will facilitate this. It is also important that these spaces are created to be inclusive to all and to remove accessibility barriers that are caused by the designed environment. Our aim is to understand how technology can be used to inform design processes for creating educational spaces by collaborating with the primary users of this space: students. This paper is organised in three main sections. Firstly, we identify changes that academics have suggested in how designing for inclusive augmented and virtual-reality environments should be practised. Secondly, we present a workshop entitled Designing for Immersive Spaces. Finally, we discusses the implications of the issues raised and the practical constraints and difficulties of implementing Inclusive Design for Immersive Spaces that is being called for.

Keywords: augmented reality, design, accessibility, UX

Creativity 4.0. Empowering creative process for digitally enhanced people

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Abstract: Creativity - the ability to produce novel and useful ideas – has become a democratic necessity and the most important human skill to face the uncertainties brought by the digital era we are going through.

This era and its digital technologies are reshaping the social, behavioural and cognitive development of digitally enhanced individuals who are growing up with digital habits. The fundamental questions that arises from this context are about the effects of the technological evolution on the creative thinking abilities of the digitally enhanced generation. What are the positive and negative impact on creativity brought by digital technology? Through a Creative 4.0 model, built from the analysis of the current scenario of transition, the paper presents an overview and some preliminary reflections about the changes that the digital technological evolution of our century is bringing on human creativity, particularly on the creative design process.

Keywords: Creativity 4.0, Digital technology, Creative design process, Digitally enhanced people, Creativity enablers

Spimes Not Things. Creating A Design Manifesto for A Sustainable Internet of Things

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Abstract: The rhetoric that surrounds the Internet of Things (IoT) contends it will bring about utopian transformative change throughout society, particularly in regards to sustainability. Little discourse however, recognises the intrinsically unsustainable nature of IoT devices themselves. Under a façade of innovation, the IoT is a breeding ground for superfluous, novelty 'gizmo' products whose design incorporates environmentally damaging modes of manufacture, consumption and disposal. To bring attention to this growing unsustainable design culture, we have produced a manifesto entitled *Spimes Not Things: A Design Manifesto for A Sustainable Internet of Things*. It is the synthesis of a practice-led research project which explores Sterling's *spimes* concept using Design Fiction methods, as part of a Research through Design approach. This paper outlines the manifesto's creation, its theoretical foundations and its intentions. The manifesto is the first step towards the reframing of design practices that will contribute to a more sustainable IoT product paradigm.

Keywords: Spimes, Sustainability, Internet of Things, Manifesto, Design Fiction

Talk The Talk, Walk The Walk. Challenging the perception of the value of verbal tools within design education environments

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Abstract: The scholars enrolling in design schools today are a whole new 'breed' of student fixated with a desire for achievement. Yet, success is not so easily attainable without great effort, application and exploiting all of the resources available to us. The current students' eagerness to reach victorious targets can cause them to pack their design toolboxes with kindred instruments – namely visual tools. While these types of tools are highly valuable to the student, verbal tools remain imperative to design thinking, communication, professionalism and industry. Consequently, an inadequate perception of the value of verbal tools and this thirst for expeditious success can be somewhat detrimental to the development of a callow designer's skillset. Students must be encouraged to talk the talk, write the words, and keep talking while they walk the walk. Therefore, in order to fully nourish and catalyse a design student's capability, designers-in-training must be equitably exposed to – and make full use of – all of the tools available to them.

Keywords: Design Pedagogy, Verbal Tools, Design Studies, Design Practice, Design History

Thinking, design. A construct of (and for) change)

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Abstract: Design philosophy has evolved; a cross-over of research and design. This paradigm shift incorporates philosophical thinking and qualitative research standards of replicable methods, informed ethical conduct and robust evidence to inform the 'art'. We propose that such thinking-design is advantageous; not being instinctively nor egocentrically biased. An increasing compatibility between designer, user and researcher is resulting in, and from, participatory action research (PAR) methods that gather deep insight. But participation is not the same as autonomy and when working collaboratively, PAR presents empowerment in-balance between 'researching-experts' and 'using-experts'; the latter's needs motivated by aspiration and emotion, rather than professional rigour of the former. Thinking, design is focused by a lens of prospective and retrospective user-led enlightenment. This poster will illustrate that democratic design does not inhibit the artistry for which design is so famed but rather that embedded collaboration to address experiential problems is advantageous, and desirable.

Keywords: Prospective, Retrospective, Co-creation, Responsible, Design

Renaissance. Chinese design in nine words

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Abstract: The description of cultural behavior or behavior-related ideology of human beings is one of the concepts of design. Based on the perspective design essence, human design behavior refers to the earliest conscious conduct (Li Yanzu, 2008). Therefore, designs can be considered as plans made by humans for forthcoming behaviors before or during the performance of actions to meet certain demands.
This poster paper was inspired by " China in ten words " which is about changes and perceptions of China's 60-year reform and uses nine key words to evaluate and discuss Chinese design. The nine key words include: intelligence, refinement, artisan, learning, fake, Jerry built, policy, Wangshuism, and Internet. These words are similar to nine pairs of eyes and nine latitudes for the examination, contemplation, and criticism of Chinese design from the ancient to the modern to the contemporary.

Keywords: Renaissance, Chinese Design, Nine, Words, Angulation

Are Local Creative Industries More Global than We Think? A study of creative and digital firms based at Baltic Creative in Liverpool

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Abstract: The Industrial Strategy: Creative Industries Sector Deal aims to increase UK creative industry exports by 50% within 5 years, claiming there is a "great deal of untapped potential in the sector." It also identifies small company size as a particular challenge to creative industry exports.

Our research, however, shows that this is not true for at least one cluster of creative industries based at Baltic Creative in Liverpool where 69 per cent of tenants export. The mean company size of exporters is 3.2 FTE, in line with the national UK creative company average size of 3.3 FTE. The turnover of these firms is highly dependent on overseas income. Over one-third of exporters earn more than 50 per cent of their annual income from exports. Company owners report that their main concern around trade is Brexit. Europe is their main trade partner with 90 percent of exporting companies trading with the EU.

Keywords: Creative Industries, Industrial Strategy, Export, Brexit, International Trade

MATUROLIFE. Combining Design Innovation and Material Science to Support Independent Ageing

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Abstract: With an ageing population there is an increasing need for effective assistive technology to enable older adults to live independently for longer. The Horizon2020 funded MATUROLIFE project will apply advanced material innovations in the design of novel assistive technology. An innovative selective metallization process is being used to encapsulate fibres in textiles to provide conductivity and electronic connectivity. This will enable better integration of electronics and sensors into fabrics and textiles.

This poster provides an overview of the design research undertaken in 9 European countries to guide the development of prototype furniture, clothing and footwear-based AT solutions that will embed these material innovations to provide informative health information to the user whilst being attractive and desirable.

Keywords: Co-creation, Qualitative methods, Printed electronics, Assistive technology, Technology integration

Educational design and business programs.

An opportunity to promote socio-economic paradigm shifts?

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Abstract: The professional design sector has always played a relevant role in the exchange of goods and services. The relationship between design and business is becoming closer and more intertwined as we witness major shifts in economic and social paradigms. Several factors shake the foundations of economic and social system: the environmental crisis, the cyclical crises of the financial system, technological advances, among others. As a result the recurrent word nowadays is "Innovation", reflecting this momentum of change. The unanswered question is whether the final objectives of the system are also changing towards new paradigms. Design may have the opportunity to serve as a lever for change that will allow to re-establish forgotten values in the scenario of new economic and social paradigms. It may be time to re-distinguish between profit and a more wide concept of benefit, without leaving behind social justice, natural ecosystems balance, ethics or art.

Keywords: Design, Business, Education, Socio-economic changes, Entrepreneurship

Fear of Missing Out = Missing out.
(or: things I saw while you were distracted by your phone)

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Abstract: This design education study confronts students' habits of constantly checking their phones while neglecting to notice their real world surroundings as a source of creative inspiration. Only in the past decade that people have been so distracted from their physical surroundings because of a **fear of missing out** (FOMO) on activity in their social media community.

When *designers* are looking down at our phones, they're **missing out** on the endless sources of inspiration surrounding us. Designers need to train their observational skills to see the extraordinary in the ordinary; this requires a relentless search for instances of wonder and discovery.

How can design students hone these skills when they're tuned out from their surroundings? Student were asked to compose 26 different photographic compositions that capture instances of visual discovery their university campus; then observe/document other students who completely overlooked this visual wonder because their phone has all their attention.

Compassionate Systems Design. A framework for sustainable cultures

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Abstract: A missing link in igniting collective action towards sustainability is the necessary change in our culture and value systems so that they truly embody 'Positive Sustainability'. Cultural celebrations help honor peoples shared values in a positive and meaningful way. However, their commercialization has resulted in a loss of their authentic values, become an excuse for excessive consumption, and waste creation that is increasingly unsustainable. The positive social values associated with celebrations also make them potential catalysts of behavioral change and profound points of intervention to fuse sustainable and cultural values.

The 'Compassionate Systems Design' framework is developed as a semester-long curriculum using cultural celebrations to explore and reconstruct more positive levels of sustainability. Students collaboratively re-imagine celebrating their authentic values while being mindful of their systemic social and environmental impact, and develop more holistic and equitable solutions by using compassion to guide their valuation and design process.

Keywords: Ethical Resilience, Culture, Compassion, Systems Design, Education

Sonic Flock. Using textile birds to start conversations within a Dementia Friendly Community in the Outer Hebrides

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Abstract: This poster outlines the innovative use of a "Sonic Flock" of interactive textile birds to explore how the making, use and gifting of textiles can facilitate conversations within and between dementia-friendly communities in the Outer Hebrides (DFC). DFC use public outreach, education and conversation to create awareness and understanding of dementia, so that "people with dementia can continue to live in the way they want…in the community they choose.' (Alzheimer's Society, 2018). The flock raised awareness of the DFC in the Outer Hebrides, engaged makers throughout the UK and brought together a range of organisations to create, exhibit and gift a flock of textile birds. The act of making, interacting with the birds in the exhibition and gifting them to care homes throughout the islands helped build relationships between researchers, local communities, care home staff and residents.

Keywords: Textiles, Sonic Textiles, Sonic Flock, Dementia Friendly Communities

A-DIARIO. Human encounters collection, Stories that we have lived or could live, small tales that help us imagine other lives and build common worlds

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Abstract: Can we create opportunities for users to tell a story and be heard, or create an opportunity to listen to someone else's story? Can we transform the moments of everyday interactions on occasion to tell stories? Can we find opportunities for users to learn more about another through new forms of interaction inside the city? What could be the role of technology in shaping the future?

Starting from empathy as the possibility to take into account, understand, and be sensitive to the feelings and thoughts of another person without having the same experience as them, and understanding it as a key emotion in the construction of citizenship. We create the research project to think in a way that we as designers can help people to connect in the language of contemporaneity. Exploring the role of technology in shaping the future, and transform the moments of everyday interactions and places on occasion to tell stories, and create meaningful dialogue and move from personal narratives to public narratives that become heart of communities, common story and understanding, building a better social environment.

Keywords: Storytelling, Community, Empathy, Oral History, AR

Design for Change

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Abstract: Reeling from the geopolitical movements of 2017, the retail sector remains a challenging environment with a number of leading mid-market players struggling to remain relevant in an increasingly crowded retail market. (Sender.T.2017) Against this backdrop of shifting consumer expectations, and a transforming business environment, innovation has never mattered more to business than it does today, however traditional business thinking and tools do not help business to innovate very well. Consequently, leaving the retail sector in a state of flux.

The purpose of the study was to examine if the integration of a new strategic design thinking model which has been developed as part of this study could be used within large retail organisations to drive innovation and organizational change. The finding from the study provided evidence that by taking the lead from entrepreneurs and smaller more agile brands who take a design thinking approach to business, large retailers are able to build a new framework and develop a toolkit that will drive innovation and opportunity creation.

Keywords: Innovation, Design Thinking, Business, Retail, Entrepreneurs

Designing the Affective Material Palette.

Using materials to explore the experience of systems and technologies designed to aid behaviour change

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Abstract: The ways that some data is communicated has been said to *"stigmatise, marginalise and trivialise disempowered social groups",* which in turn may alter the way is received, understood and acted upon by the recipient. There is a call for counter mapping to challenge the one size fits all style (Lupton, D 2017). Drawing on the affective potential of both data representation and materials, embodied methods are implemented to inform a design process resulting in 'data materialisation' as a response to identified issues from fields of digital health and behaviour change. Engaging with theory and practice from textile design as a framework for the speculative design of digital health technology experiences, creatives in a week-long workshop programme tackled issues and responded through making; prototype 'material experiences' and 'data materialisations' designed to elicit affective response.

Keywords: data, textiles, design, experience, sensory design, materials, affect

From User Insights to Evidence-Based Strategy Selection. Designing for Behaviour Change with the Behavioural Lenses Approach

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Abstract: This workshop provides participants with the opportunity to familiarise themselves with the Behavioural Lenses Toolkit. This toolkit supports designers in using theory from the behavioural sciences to inform their work. The workshop consists of an introduction to the toolkit and a couple of hands-on exercises in which we will demonstrate and try out the toolkit in establishing use(r) contexts in behavioural design projects. Furthermore, we will try out a new prototype tool that supports making an evidence-based transition from user insights to behavioural change strategies.

Keywords: Behaviour Change, Behaviour Design, Design Tools, Design Methods

Using digital agile communities in industrial design

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Abstract: Being agile is a hot topic in the design industry today. However, within industrial design there are many challenges to be faced when becoming more agile. One of the barriers is that conducting research with users in a traditional way can be time consuming and costly. Demands from the agile movement are pushing those in industry to come up with better and more efficient ways of keeping users in the loop throughout the design process. This workshop introduces participants to digital agile communities. This is a tool used by researchers and designers to iteratively 'check in' with users, test ideas and respond to user feedback. Participants will interact with a live digital agile community, sharing their own design sketches generated in the session with real users. The intention of the workshop is for participants to engage with a new tool and inspire discussion into agile research methods for industrial design.

Keywords: agile; design research; industrial design; research communities

Hidden Treasures. Discovering the Design Potential of Natural History Collections

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Abstract: Biomimicry is a practice that seeks to translate nature's strategies into sustainable solutions. The emerging discipline has the potential to become a leading approach for sustainable design. When it comes to drawing inspiration from nature, nothing beats an up-close study of real-life plants and animals. While metropolitan regions may be far from wildlife preserves and natural habitats, they still offer tremendous troves of biodiversity: the neatly organized collections of natural history museums. These collections contain organisms ranging from insects and birds to plants and reptiles, bringing biological inspiration from around the world to the fingertips of designers. This workshop, offered at the D'Arcy Thompson Zoology Museum, will introduce participants to the hidden design possibilities of natural history museums. Participants will engage in guided activities that help them derive design inspiration from nature.

Keywords: Natural History Collections, Biomimicry Thinking, Life-centered Design, Biology

Designing Diverse Design Dogmas, Deliberately. Using aspects of Design on its practitioners to set the challenge of imagining alternative ways of designing

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Abstract: Design and its practitioners use many methodologies, methods, mindsets, manuals and motives. There is a plethora of documentation that focuses on defining, categorising and theorising these aspects of Design, how they came to be and what should be taken from them. However, what happens if we turn these tools on ourselves and try to design and imagine other forms, concepts, manifestations of design itself? 'Design' as the topic, 'design practitioners' as the users and 'the designed' as methods, mindsets, beliefs and so on. The outcomes of these curiosity-led activities are not predefined or that predictable, they rely on providing tasks and tools to ignite inquisitiveness and lay the groundwork for serendipity and unexpected occurrences. The participants will leave with more curiosity about what Design can be, leading to new questions about the discipline and its practices.

Keywords: Critical Practice; Participatory Research; Design for Designers; Basic Design Research

Co-designing Improvements of Knowledge Exchange Tools

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Abstract: This workshop will present and validate the usefulness of a framework for improving knowledge exchange (KE) tools. We propose an improvement framework, where participants collaboratively improve the functions, instructions and flexibility of tools to develop their engagement practices. In this workshop, we will lead participants through a creative engagement activity, where participants will learn through doing how to improve KE tools within a collaborative improvement framework. The potential workshop outcomes are new tool ideas and knowledge as a result of a collective and fruitful experience among participants. Participants will gain new knowledge on how to improve the engagement with groups of non-designers through the improvement of KE tools and other tools, such as participatory tools. Further research involves inviting participants to take part in a research study on the potential applications of the improvement framework to their own work.

Keywords: Co-design; Knowledge Exchange; Creative Engagement; Improvement of Tools

"All You Can Eat". Prototyping Speculative Food Futures

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Abstract: This workshop is concerned with the relationship between food and global health, and in particular with the role that design can play as a futuring practice (Fry, 2008). Industrial food and food practices have contributed to both human and planetary ill-being. This has been captured well in UN's 17 Sustainable Development Goals, which are linked directly or indirectly to food. The proposed workshop will employ speculative design, to engage participants in developing a menu of provocative solutions that would help the design community identify and map possible direction for design research in the areas of food, design and global health. The workshop outcomes will include a visual workshop report to be published on the EAD website, an illustrated menu of provocative speculative design solutions that map future food/design directions and a Little Book of 'Speculative Design Food Futures'.

Keywords: Food, Health, Speculative design, Sustainable Development Goals

Design/health. Exploring tensions in design and health for more effective trans-disciplinary collaborations

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Abstract: The academic disciplines and practices of design and health currently operate within different spaces and draw on disparate paradigms relating to how knowledge is created and disseminated (Reay et al 2017). Whilst the value of bringing design and health together is increasingly being recognised the reality is that this can be fraught with complexity (Harris and Lyon, 2014). Within design for instance, disruption and risk are regarded as creative catalysts, which can lead to the generation of new insights. Within healthcare risk is frequently seen as a negative force and to be avoided at all costs. This interactive workshop based around a series of crafted challenges offers participants the opportunity to explore these tensions and to work together to identify different routes and ways forwards.

Keywords: Design, Health, Risk, Collaboration, Values

Experimenting productive disagreement between research and project in design.
A basemap for action

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Abstract: Our workshop addresses how research and design intertwine and also place and look for a clear position one from each other. The main objective of the WK is to question respective positions of the researcher and the designer and to understand how research and design distinguish each other but also seek complementarities. More specifically, we propose to experiment 'productive disagreement' during the WK in order to foster respective position and identity (skills, competences) and mutual contribution. The methodology will be based on sensible insights, ethnographic approach and participatory observation, visual and creative methodologies (role-play, hand drawing, diagrams, system maps). Designers and researchers are invited to participate and will be involved in the design process of the workshop.

Keywords: Design's epistemology, project-grounded research, methodology, human and social sciences

Nature-Centered Design. Exploring the path to design as Nature

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Abstract: The language of nature is embedded in the way we speak, name things, create architectural constructions or develop new materials to thrive as specie. The ecological, sustainable or the biologically-inspired design definitions are signs of a collective intelligence. Searching new educational ways to rediscover and implement nature´s strategies is helping us to redefine a new ethic for the designer, a Nature-Centered one. This workshop is intended to provide an initial exploration of how design academics and researchers understand and find an accurate meaning of Nature-Centered Design (NX) by creating a speculative syllabus content. Through mixed methods it will be divided in two sections and conducted in a close-to-nature setting.

Risk & Reward. Exploring Design's role in measuring outcomes in health

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Abstract: Collaborations between the fields of Design and Healthcare often involve navigating epistemological differences in terms of what is considered robust 'evidence.' Whilst Design approaches are gaining traction in healthcare contexts, the scientific paradigm of evaluation remains in a privileged position. This creates a challenge for designers working in healthcare, but also an opportunity. This workshop aims to explore the role of Design in expanding understanding of impact of medical interventions, products or services beyond traditional (and dominant) quantitative methods, towards broader, experiential and contextualised outcome measures. By focussing on the context of child prosthetics as a particularly risk-laden area of investigation, participants can expect a fast-paced, interactive and collaborative session. By maintaining a focus on learning through making, participants will be invited to share their own experiences as well as imagine new ways of supporting young patients and family members in communicating the complex, real-world impacts of their medical devices.

Keywords: Healthcare, Evaluation, Values, Prosthetics

Designers Should Evaluate Their Work. You say those are scissors you are running with, but do they even cut?

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Abstract: Designed artefacts for health and wellbeing presuppose an actual impact on people's health or wellbeing; similarly, proposed improvements to design processes presuppose improved design processes. Unfortunately, design(research)ers often do not evaluate the efficacy of their designed artefacts and processes. This paper argues that it is essential to evaluate the assumed effects of designs and processes, to avoid common pitfalls and encourage the growth of knowledge, as a responsibility towards the users of our designs, and to enable an exchange with adjacent fields. To encourage doing so, the paper offers recommendations for evaluation strategies that fit designerly methods.

Keywords: Evaluation, Design process, Design Efficacy

Towards a regenerative design culture.
Nature-culture fluidity vs. analytics: friends *and* foes?

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Abstract: At a time when design's regenerative role is both expanding and increasingly recognized, society is facing growing resilience and diversity challenges. Although policymakers attempt to address these challenges, their toolkit does not seem to keep up with current dynamics tangled between nature's elusive flow and society's rapid rate of change ignited, amongst others, by all-time-high migration levels, omnipresence, digital footprints, and an expanding universe of data. This position paper advocates for enabling a regenerative design culture by bringing policy making closer to the nature-culture dualism (Siivonen, 2008; Siivonen et al., 2018) and considering the qualitative (Barth, 1969; Hannerz 1992; Peirce, 1991) and quantitative (Iyengar, 2009; Hofstede 1984, 2001; Trist, 1981; Manovich, 2018) approaches as constituents to one another, not separate of each other. The paper proposes twelve cultural dimensions and a potential evaluation scale for designing policies that would inspire resilient futures co-designed with nature.

Keywords: nature-culture dualism, resilient futures, cultural analytics in policy-making

Being safe is scary. Increasing precariousness in co-design

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Abstract: Design has found itself dealing with an increased degree of participation in recent years, through incremental shifts the perspective has change from customer to value co-creator. This has led to design being associated with facilitation and fostering of the diffuse design capacity of the target group than a creative endeavour undertaken by experts. Designerly education, and namely the design studios, exemplify the need for the creation of hands on knowledge for the growth of one's design capacity. However, we seem to forget this perspective when engaging in social innovation that aims towards the evolution of diffuse design capacity of creative communities. Turning to two notions that highlight the situated cognition and embodied knowledge we aim to reframe this process in the context of service design and craft in hopes that this will be conductive to transitioning towards sustainable lifestyles.

Keywords: diffuse design capacity, co-design, Focal things and practices, mastery, social innovation

Design-driven obsolescence

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Abstract: Design-driven innovation increased the power of design discipline through the diffusion of a new important way of thinking: design is also able to change the sense of products. The consequence of this approach was the generation of new design-oriented products but also the dissemination of a design approach even in market fields that were formerly not-design-oriented. The economic advantage of design-driven innovation guaranteed the approval of this approach even in design schools, without hesitation. But are we sure that a design-driven innovation is always positive? What happens if design drives the substitution of a product too soon or too quickly? Is there also a negative effect of design-driven innovation? Could we call it design-driven obsolescence?

Keywords: Design-driven, Innovation, Obsolescence, Product, Didactics

Felicitous Design Concept. Harmonising marketing and design on product, process and strategy levels

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Abstract: Although marketing and design are considerably interrelated and interconnected concepts, there are few practical frameworks to establish collaborations between these two disciplines. This paper introduces the 'Felicitous Design Concept' as a framework which can take advantage of the synergy between existing theories, in particular, Societal Marketing and Persuasive Design. It aims to represent the way that marketing and design cooperate on multiple realms including product, process and strategy.

Keywords: Persuasive Design, Marketing, Societal Marketing, Modes of Persuasion, Vitruvian Triad

Skin deep. Perceptions of human and material ageing and opportunities for design

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Abstract: In Western society there is an obsession, fuelled by pervasive advertising, with hiding the effects of ageing and maintaining skin that exudes 'youthful perfection'. Rapid unsustainable purchasing and disposal of mass-produced objects is, in part, driven by 'cosmetic obsolescence' - changes to the pristine material surface which are perceived as damage and degradation. We consider the parallels between these attitudes to changes in material surfaces and human ageing, and propose that actively considering future material change in product design could increase product longevity with both environmental and social benefits.

Keywords: obsolescence, ageing, cosmetic, longevity.

Designing New Socio-Economic Imaginaries

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Abstract: This short paper recovers the term 'imaginaries' which is often used in the social sciences to describe a meaning system that frames individuals lived experience of an inordinately complex world. The paper goes on to reflect on the extent to which design has the capability to disrupt imaginaries through the development of products in order for people to construct new ones, or whether the discipline is perpetuating old models of the world. The paper uses a workshop method to explore socio-economic models in order to better balance the multiple imaginaries that participants hold with the opportunity to design disruptive and critical propositions. Reflections upon the workshop and the concept of imaginaries allows the authors to identify a challenge for design in which it must accept its role as mediator and exacerbator.

Keywords: Imaginaries, Economic, Design, Smart Contracts

Lessons from Designing for End-of-Life

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Abstract: The Delft Design for End-of-Life Lab aims to improve, through design, Quality of Death and Dying (QoDD), that is, the Quality of Life (QoL) in its final stage. In that context, quality of life is defined by the comfort experienced in the physical, social, psychological and existential domains, while taking into account what matters to people in the final stage of their life.

The different design research projects carried out in the End-of-Life Lab lead to insights in how to design for quality of life in its final stage. In return, these insights may be valuable starting points for reflections on designing for quality of life in general. These insights are related to designing as a process and to the related required sensitivities of designers. The key insights are: the need for a 'relation-centred' design approach, the need for time and patience, the need for room for uncertainties and the need for a care-ethics approach to moral dilemma's.

Keywords: End-of-Life, Quality-of-Life, Design Reflection, Design Sensitivity

Sharp edges, blunt objects, clean slices.
Exploring design research methods

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Abstract: Design Inquiry is perhaps always needing to run with scissors, that design-centred capacity and ability to work with materials, means and methods to develop research that is context specific, abstract and conceptual. This is important for collaborative and transdisciplinary inquiry in, on and through design as well as situations in which a diversity and mix of professional design expertise and design-academic analysis are included. This paper concerns the ongoing need for clarification, articulation and implementation, as well as critique, concerning how research methods and design practices may be better connected, placed and understood. Design research that is qualitative in nature needs to consider methods and means, that is epistemological challenges and opportunities, if it is to move beyond framing, using and reflecting on knowledge making as more than a blunt version of inquiry. We include a performative activity to enact a shared methodological experience of Running with Scissors.

Keywords: Qualitative inquiry, research methodologies, research methods, design techniques, design tools

Design Meets Death. A case of critical discourse and strategic contributions

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Abstract: End-of-life is a profound and inevitable part of life, and thus, human condition. It raises significant and critical questions around the meaning, purpose, fairness and quality of life, on multiple individual, inter-personal, and societal levels. Design for end-of-life is an emerging area, gaining visibility and interdisciplinary interest. Current contributions around design and end-of-life are however, limited and disjointed, lacking in critical knowledge base and strategic vision. While valuable, such rush into interventional, operational and incremental contributions, is archetypal of design's 'problem-solving' approach, and would risk obscuring the broader and potentially significant theoretical, methodological, and empirical contributions between design and end-of-life. This paper argues the case for adopting a 'problem framing', transdisciplinary, systemic approach to this fascinating emerging field. By initiating, for the first time, a theoretically and empirically informed critical discourse between the two fields of design and end-of-life, critical questions, strategic opportunities, and significant contributions between the two fields could be identified and outlined.

Keywords: Design, Death, Dying, Palliative and End-of-life Care, Critical discourse

A Semiotic Rosetta Stone Research Project.
Defining designer-centric semiotic practice

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Abstract: This research project will provide a richer understanding of how a designer-centric reframing of Peirce's semiotic theory could manifest itself. We propose to run it throughout the length of the conference with EAD's design delegates opting in through informed consent. It will pragmatically construct a body of sensory data from a *semiotic probe* (a variation of a cultural probe) that participants will complete in their own time. We would like this probe to be distributed in the EAD conference goody bag at conference registration. It will feature several practical visual tasks, plus a semiotic audit section, and it would be collected during the conference. From the *semiotic probe* data we aim to discover how Peirce's complex terminology could be translated into a designer-centric meta-language. Like the historical Rosetta Stone, this data would then help designers and theoreticians to improve the communicational situation in disseminating Peircean semiotic theory.

Keywords: Designer, Tacit knowledge, Peirce, Semiosis, Rosetta Stone

Improvement Matrix. Prompting New Ways of Thinking about Knowledge Exchange

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Abstract: The improvement matrix is a framework used for improving knowledge exchange tools in order to develop engagement practices. It consists in a new improvement practice, in which engagement practitioners collaboratively improve the functions, instructions and flexibility of tools to develop their own practices. This research aims to look at potential applications of the improvement matrix in other design practices to establish its quality and credibility. In this research project, we will present the improvement matrix to delegates, and engage participants to provide critical feedback on the research claims presented in the framework. This can happen as a 1-on-1 or as a group discussion at any point in the conference to be negotiated with participants. Participants will gain new knowledge on how to improve tools through reflecting on how the framework can be applied to their practices. The potential outputs will allow the researchers to reconsider certain elements of the framework.

Playing with uncertainty. Experiential design and sensemaking for radical futures.

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Abstract: This research proposal seeks to explore and report on individual and collective responses to a design intervention or provocation using design fiction and experiential futures tools and methods. By deliberately invoking uncertainty – an amorphous concept that expresses both the probability that certain assumptions made during design are incorrect as well as acknowledging the potential influence of unknown facts on future states and therefore the possibility of intended and unintended consequences – we are experimenting with the premise that to design is to engage with an exploration of ideas towards the yet to be. Our proposed experiments aim to extend the integration of design and futures for conference attendees by revealing and extending uncertainty and providing tools for making and prototyping future visions and the artefacts that may populate those visions.

Keywords: Design futures, Foresight, Scenarios, Speculative design, Sensemaking

Dundee Dice Walk

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Abstract: Walking in the city without a definite aim, allowing the occurrence of chance encounters and sensory experiences, is an idea that has been explored in various ways through the 20th Century, through the figure of the 'flâneur' as described by Walter Benjamin, in Surrealism, and DADA using chance operations, and later by the Lettrists and Situationists, with their concept of the 'dérive' (drift). These practices, which are loosely termed 'psychogeograhy', have been rediscovered and reinvented in recent years by (amongst others) Sterwart Home, Will Self, Iain Sinclair and Nick Papadimitriou. The interdisciplinary nature of psychogeography, with its open ended and playful character, presents an approach to the city which resonates with the concerns and practices of design. These themes provide the background to this early morning walk which will use dice to define a spontaneous route around the conference environs.

Keywords: Psychogeography, Dérive, Serendipity, Urbanism

Take a GANDER. Gathering Accessibility Needs by Doing Explorative Research

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Abstract: Design is not constrained to physical objects and increasingly the digital can be a source of inspiration for new modalities and techniques that can be used to enhance our perceptions of the world. We interact with technology (e.g. smartphones) on a daily basis whilst traversing the physical environment, but little work has been carried out to examine how the physical world that we live in and the digital world that we inhabit interact with each other. We invite conference attendees to participate in a 2-mile gander (lasting 1 hour) hosted by the UX-d Research Group and invite them to challenge their design thinking by examining how the digital and physical worlds interact with each other.

Keywords: Accessibility, mobile technology, User Experience.

Walking Heterotopias

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Abstract: The purpose of this walk is to stir dialogue among conference attendees and also others who currently have, or have had experiences of mental health problems, recruited for participation via a local mental health organization. In essence, the idea is to wander around the city in pairs, guided by conceptual maps as props or co-reflection tools, in order to discuss current notions around mental distress in an embedded way, through the walking. In 1967, Foucault spoke about heterotopias of crisis and heterotopias of deviation, thus places in which individuals whose behaviour is deviant in relation to the required mean or norm were placed, such as psychiatric hospitals. Now that these spaces are disappearing, how can we reconceptualise crisis and deviation? We experiment this through asking participants: What are the moments or *instances* that come to mind when we walk through the city, which relate to our notions and experiences of crisis and deviation?

Keywords: uncertainty, mental health, urban environment, heterotopia.

A Walk in the Woods. Promoting Chance and Wellbeing at EAD 2019

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Abstract: Our walk proposal is inspired by the 'Happy Accidents' track which asks how the opportunities for chance meetings and creative connections between researchers and/or designers can be maximized. We propose to experiment with walking as a means of achieving this for design researchers while attending a conference, while also offering an early morning walk as a means of supporting design researcher's wellbeing during a conference

Keywords: Wellbeing, Shinrin Yuko, Walking, Narrative